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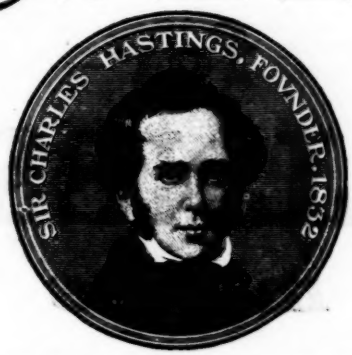

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An Address
ON
PROGRESS AND PROSPECTS IN CHEMOTHERAPY.

DELIVERED IN THE SECTION OF PHYSIOLOGY OF THE BRITISH ASSOCIATION AT TORONTO

BY

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[AFTER a brief reference to the discovery of insulin in the physiological department of the University of Toronto, Dr. Dale turned to the subject of his address, as follows:]

I. THE THEORETICAL ORIGIN OF CHEMOTHERAPY.

Chemotherapy may be defined as the specific treatment of infections by artificial remedies. The object of those who study it is to find new remedies which will cure or arrest diseases due to infections, not by alleviating the symptoms or invigorating the patient, but by directly and specifically suppressing the infection. Chemotherapy, in this wide sense, is not entirely of recent growth. When the natives of Peru discovered the value in fevers of the cinchona bark, which the Jesuits brought to Europe in the seventeenth century, they had found a specific remedy for malaria, which is still the best available. Similarly the natives of Brazil had found in ipecacuanha, which reached Europe shortly after cinchona, a remedy for amoebic dysentery better than any other which our modern systematic and scientific efforts have produced. Modern chemistry, indeed, has separated the alkaloids from these drugs, and has made it possible to identify among them the actively therapeutic constituents; protozoology has revealed the nature of the infections. We know now that cinchona owes its curative action chiefly to quinine and quinidine, and that they act as specific exterminators of the malaria parasites, and not simply as remedies for fevers in general; and we know that ipecacuanha owes its action to emetine and cephaeline, and that these act as exterminators of the entamoeba causing tropical dysentery, and not simply as symptomatic remedies for dysenteries of any kind. But chemistry has produced no better remedy for malaria than quinine, or for amoebic dysentery than emetine; and the method by which either of these alkaloids cuts short the infection by a particular parasite, the nature of its specific action, remains a fascinating problem.

The modern development of chemotherapy, as a new department in therapeutic science, claiming the co-operation of parasitologists, microbiologists, and synthetic chemists, did not take origin, however, simply from the study of these traditional remedies. It may be regarded rather as an outcome of the study of the natural antibodies. The investigation of these natural antagonists to infection produced a new therapeutic ideal. Not only had they shown themselves to have an intensely specific affinity for the infecting organism of the toxin which caused their production; they were also perfectly harmless to the patient, behaving, in relation to his organism, as normal constituents of his body fluids and tissues. Ehrlich aptly compared them to magic bullets, constrained by a charm to fly straight to their specific objective, and to turn aside from anything else in their path.

Of the artificial remedies, on the other hand, which man had empirically discovered, even of drugs like those just mentioned as being specific for certain infections, the best that could be hoped was that they would eliminate the parasite before they poisoned the patient. And thus, when the limitations of natural immunity were becoming clearer; when it was realized that to certain forms of infection, several of which had proved to be infections by protozoa, the body was unable to produce antibodies of sufficient potency to eliminate the infection and leave the patient immune; the question arose whether, with the new and growing powers afforded by synthetic chemistry, man could not so far rival Nature's achievements as to produce, in the laboratory, substances specifically adapted to unite with and kill the protoplasm of these parasites, as the natural antibodies united with that of others, and to leave the tissues of the patient similarly unaffected. The ideal of this new and systematic chemotherapy, as the imaginative genius of Paul Ehrlich conceived it, was to be the production by synthesis of substances with a powerful specific affinity for, and a consequent toxic action on, the protoplasm of the parasites, and none for that of the host—of substances, to use Ehrlich's own terminology, which should be maximally parasitotropic and minimally organotropic.

I want to invite your attention to-day to the results which, during the last twenty years, have been produced under the stimulus of this bold conception; not, indeed, to attempt a survey or summary of all that has been done, but, in the light of a few of the suggestive facts which have emerged, to consider how far this hypothesis has justified itself, and whether it can be accepted as a safe guide to future progress, as it has undoubtedly provided the initiative and working basis for much of what has been accomplished hitherto. Before we deal with some of the actual results obtained, it may be well to consider a little more closely what Ehrlich's working hypothesis involved. The problem was to discover, by chemical synthesis, a compound which, in virtue of its chemical structure, should have a maximal affinity for the protoplasm of a microscopic parasite, such as a trypanosome, and a minimal affinity for that of the host's body cells. These affinities were pictured by Ehrlich as determined by certain side-chains of the complex protein molecule, or chemoreceptors, which endowed the protoplasm with specific combining properties. When it is remembered that knowledge of the chemistry of the protoplasm of a trypanosome is almost *nil*, and that what little we do know suggests that it is very similar to that of our own cells, it will be admitted that the enterprise was one calling for scientific courage and imagination in the highest degree. Complete failure would not have been surprising; the matter for surprise, and for admiration, is that so large a measure of practical success should, at the end of two decades, already claim record.

II. TRYPANOSOMES AND SPIROCHAETES.

1. *The Action of Dyes and Analogous Compounds.*

The investigations leading, in the last few years, to a clear promise, at last, of the successful treatment of the diseases in man and animals due to infections by trypanosomes, had at least two different starting-points—the action of dyes and the action of arsenic. Ehrlich's early interest in the synthetic dyes, and his observations of the curiously selective distribution which they often exhibited among the cells and tissues of the body, naturally suggested the possibility of finding, in this group, a substance which would selectively fix itself to the parasite and poison its protoplasm, without injuring that of the host. The technique developed by Laveran and Mesnil, by which a particular strain of trypanosomes could be passed through a series of mice or rats, and produce an infection of standardized type and virulence, enabled the effect of a large selection of dyes to be investigated, with the view of finding one which would favourably influence the infection. A starting-point having been obtained, the resources of synthetic dye production were available to produce an indefinitely long series of derivatives and modifications of the active compound, each to be tested in its turn. In this way Ehrlich and Shiga arrived at a substance which gave experimental promise of curative value, a benzidine dye to which the name "trypan red" was given. Two years later Mesnil and Nicolle, proceeding further along the same path, described an even more favourably active blue toluidine dye, "trypan blue." This is the only one of the dyes which has hitherto had a genuine practical success in the treatment of a protozoal infection,

not indeed by a trypanosome, but by an intracorpuscular parasite of the genus Piroplasma, which infects dogs and cattle. This successful application of trypan blue to an animal disease has a special interest for us to-day, in that it resulted from the joint labours of last year's President of this Section, Professor Nuttall, with a Canadian collaborator, Dr. Hadwen.

We may turn aside at this point to inquire how far the results even of these earlier investigations corresponded with the theory which gave them their impetus. Did these dyes really act by selectively staining and killing the parasites, and leaving the host's cells untouched? The evidence was certainly not in favour of such a view. Ehrlich and Shiga themselves observed that trypan red, even in relatively high concentrations, was practically innocuous to the trypanosomes outside the body. The trypanosomes, like other cells, were not stained by the dye until they died, and there was no clear evidence that they died sooner in the trypan red solution than in ordinary saline. Again, trypan red cured an infection by the trypanosome of "mal de Caderas" (*T. equinum*) in the mouse, but not the same infection transferred to the guinea-pig, rat, or dog; nor did it cure an infection with the trypanosome of nagana (*T. brucei*) in mice. Now, to explain such a difference by stating that the affinity of trypan red for *Trypanosoma equinum* was much higher than its affinity for the tissues of the mouse, but not than its affinity for those of the rat, would be merely to restate, in terms of the theory, the observed fact that the mouse was cured while the rat was not; and the lack of direct affinity for the dye shown by trypanosomes outside the body made such an interpretation in any case unsatisfactory. One point, however, appeared very significant, and it is met repeatedly in studying the action of effectively chemotherapeutic substances—namely, that the trypanosomes treated with the dye *in vitro*, though neither obviously stained nor visibly harmed, had lost their power of infection, and died out promptly if introduced into the body of a mouse. Under such conditions only minimal traces of the dye are introduced into the animal, and we are left with a series of alternative possibilities. It is possible that sufficient dye has been taken up by the trypanosomes to kill them eventually, the period of survival *in vitro* being inadequate to display its action; or that trypan red is converted by the influence of the body fluids and tissues into something which is effectively lethal for the parasite; or, again, that the effect of the drug is not directly to kill the trypanosomes, but, leaving their individual vitality and motility unimpaired, so to modify them that they have lost the power of rapidly reproducing themselves and invading the fluids and tissues of the mouse's body—in other words, have lost that complex of adjustments to the various factors of the host's natural resistance which we crudely summarize as "virulence." Such possibilities involve either storage or modification of the dye by the host's tissues, or their essential co-operation in its curative effect.

One other active dye must be mentioned as providing the link with a recent, most important advance. Mesnil and Nicolle in 1906 made some promising experiments with a dye, afridol violet, which differed from any previously tested, in that its central nucleus was diamino-diphenyl-urea. From this time onwards there was no further public indication of progress along these lines until 1920, when Händel and Joetten published the results obtained with a remarkable substance which, as the result of some fifteen years of continuous work by their scientific staff, had been introduced by the great dye and chemical firm of Bayer. This substance, which is not a dye, but the colourless, water-soluble salt of a complex sulphonic acid, has hitherto been known as Bayer "205," and, for reasons which need not concern us, the firm decided not to publish its formula. To students of the patent specifications, however, it seemed pretty certain that it would prove to be one of a long series of compounds, formed of chains of amino-benzoyl radicles, united by amide linkages, with a central urea linkage, like the dye last mentioned, and terminal naphthylamine sulphonic acid groupings. A number of these substances, having no diazo-linkages, were not dyes, but there was no indication as to which constitution, out of an immense number possible, would prove to be that of the remarkable substance numbered "205." There is a reasonable probability that its identity has now been settled by the recent work of Fourneau and his co-workers in the Pasteur Institute, who made and investigated an extensive series of compounds of this general type, and found one, which they numbered "309," which conspicuously excelled all others, even those closely related to it, in the favourable ratio which it displayed between a just toxic dose and that which caused a trypanosome infection in mice to disappear. As in the case of "205," the ratio, the "chemotherapeutic index" of Ehrlich, was found by Fourneau, in some experiments with his compounds, to be well over 100. At least it may be said that, if M. Fourneau has not identified Bayer "205," he has discovered another compound having very similar, and probably as valuable, properties.

The most remarkable property of "205" is the long persistence of its effect. A dose injected into a mouse, a rabbit, or a rat will not only free the animal, if already infected, from trypanosomes in a few days, but will also render it resistant to such infection for a period of weeks or even months. During that period its serum, or extracts from certain of its organs, exhibit a curative action if injected into another animal infected with trypanosomes.

Though there seems no reason to doubt that this substance has cured a number of cases of African sleeping sickness in man, even some in which the disease was well advanced and in which all previously known remedies had failed, the mode of its action still presents a number of attractive obscurities. Like many other remedies which are experimentally efficient when injected into the infected animal, it has little or no obvious action when directly applied to trypanosomes *in vitro*. The paradox is, perhaps, less than usually significant in this case, since the action in the animal is delayed, a period of a few days elapsing before the trypanosomes begin to disappear from the blood. We might suppose that the action is too slow to be recognized during the period of survival of the parasites outside the body, or that it affects not the individual vitality of the trypanosomes, but their power of reproducing themselves. The latter idea is supported, as in other cases, by the fact that trypanosomes treated with the drug *in vitro*, or taken from an injected animal before the curative effect has become manifest, fail to infect another animal. It is contradicted, however, by the observation that the trypanosomes, just before the curative action begins, show not a depression, but a stimulation of reproductive activity, division forms becoming abnormally common. Is it that during or immediately after division the parasites become specially liable to the action of the drug? It may be so; but one thing seems perfectly clear—namely, that the action is a very complex one, involving the co-operation, in some way, of the host. For here again it is found that the curative action, on infections by the same strain of trypanosomes, varies enormously with the species infected, a mouse being cured with ease, an ox or a horse with difficulty or not at all. A curious fact is that the rapidly progressive and fatal infections produced in mice by certain pathogenic trypanosomes are easily and certainly cured, while the apparently harmless natural infection, seen in many wild rats, by *T. lewisi* is not affected at all. Then there are some curious records of treatment in man, in which the symptoms of sleeping sickness have disappeared, but the trypanosomes are still found in the cerebro-spinal fluid, suggesting that, though the parasites have not been killed, they have lost their virulence and their power of invading the brain substance.

The features of the action of this remedy, however, which have most interest for the physiologist and the biochemist are those related to the long persistence of its effect. "205" has a large molecule, but it is extremely soluble in water, and diffusible through collodion membranes. How, in such circumstances, can we explain the persistence of its sterilizing and prophylactic action for months after an injection? At first sight one is tempted to regard it as incredible that a substance with these properties should persist in the body for such a period, and to suggest that the action must be due to its stimulation of the body to form its own protective substances. This possibility, how-

ever, seems to be excluded by the fact that the serum of the protected animal does not lose its curative properties if heated. On the other hand, there have recently appeared, some of them only in preliminary abstract, a series of highly suggestive observations, indicating that "205" has properties of entering into a combination of some kind with the serum proteins. After standing for an hour or two in serum, "205" no longer passes into an ultra-filtrate through collodion, and if the proteins are coagulated by heat is not to be found in the filtrate. The proteins of the blood, moreover, are stated to lose many of their characteristic properties by entering into this combination, the blood losing its normal power of clotting, and the serum proteins not being precipitated by mercury salts or tannin.

It would be both useless and presumptuous for a mere onlooker to speculate in detail on the significance, for the curative action of "205," of properties which are only now beginning to be investigated. One conclusion, however, I think we are entitled to draw. It is sufficiently evident that here is no question of a substance curing simply on account of its affinity for parasites and lack of affinity for the host's tissues. What direct action on the parasite "205" itself may possess has still to be demonstrated; we may feel reasonably certain, on the other hand, that its affinities for the constituents of the host's blood and tissues play an important part in its remarkable and peculiar curative properties.

2. *Derivatives of Arsenic.*

In the case of the other series of investigations which I mentioned, that dealing with the organic derivatives of arsenic, we find again many difficulties, in the way of the simple theory, of a cure due to distribution by chemical affinities. None of the compounds of this series, which have reached practical trial and success in the treatment of spirochaetal or trypanosomal infections—atoxyl, salvarsan, or tryparsamide—has a directly lethal action on the parasites in dilutions at all comparable to those which can be safely and effectively produced in the body of the host. The paradox of this direct inertness of atoxyl, the starting-point of the series, seemed to be explained when Ehrlich showed that its reduction to the corresponding arsenoxide produced a substance with an intense directly lethal action on trypanosomes. Similarly the partial oxidation of salvarsan, to the corresponding arsenoxide, produced a substance having the intensely lethal action on spirochaetes or trypanosomes *in vitro* which salvarsan itself conspicuously and paradoxically lacked. In these cases we may make the supposition, which Voegtlin and his co-workers especially have recently supported by detailed evidence, that the reduction or oxidation effected by contact with the tissues is the essential preliminary to the curative action; a supposition which, it will be noted, again introduces the host as an essential participant in the cure. The fact that the administration of these relatively inactive predecessors is therapeutically more effective than the injection of the directly active oxides derived from them would then be explained on the assumption that the slow liberation of these latter in the body, at a rate which never produces a high concentration, provides the optimum condition for their persistent action on the parasites without danger to the host. This slow and persistent liberation of the directly active substance would be favoured by the physical properties of salvarsan, which at the reaction of the body is practically insoluble, and must be rapidly deposited after injection.

In their recent work on the action of tryparsamide—the compound prepared by Jacobs and Heidelberger at the Rockefeller Institute, which has shared with Bayer "205" the credit of making the eventual conquest of African sleeping sickness a hopeful possibility—Brown and Pearce find it necessary to introduce yet other considerations to explain its effects. Tested by Ehrlich's therapeutic index—the ratio between the lowest curative and the highest non-toxic dose—it gives a relatively unfavourable figure. Brown and Pearce practically abandon the attempt to account for its action on the supposition that it directly kills the parasites, and attribute its value largely to its power of penetrating easily into the tissues and reinforcing there the processes of natural resistance.

3. *Action of Bismuth.*

Another conception of the mode of action of these arsenical remedies, also involving a direct participation in the host's tissues, was put forward by Levaditi. He found that from atoxyl a directly parasiticidal preparation could be obtained by incubating it with an emulsion of fresh liver substance. As the first step, therefore, in the curative action of atoxyl, he postulated a combination of its reduction product with some constituent of the liver or other tissue, giving rise to the essential curative complex, which he named "trypanotoxyl." Levaditi's observations were explained by Ehrlich and Roehl as due simply to the reducing action of the liver substance on atoxyl; but it would be difficult to apply this explanation to the quite recently published observations by Levaditi and his colleagues on the mode of action of bismuth in curing spirochaetal infections. A sodium potassium bismuthyl tartrate—a bismuth analogue of tartar emetic—had been found to have valuable curative properties in syphilis and other spirochaetal infections. Later, various other bismuth salts, bismuth suboxide, and even finely divided metallic bismuth, were found to produce similar effects. According to Levaditi and Nicolau, these preparations have, by themselves, a relatively weak action, or none at all, on the spirochaetes outside the body. If they are mixed, however, with a cell-free extract of liver, which is itself harmless to spirochaetes, the mixture, after incubation, acquires a potent spirochaeticidal action. The possibility of a mere reducing action of the liver extract seems here to be excluded, since bismuthous oxide, or metallic bismuth itself, yields a spirochaeticidal mixture, containing Levaditi's hypothetical "bismoxyl," when incubated with the liver extract. If these observations are confirmed, there will be a strong indication that some cell constituent enters into the composition of, or is essential to the formation of, the directly active substance from any of the derivatives of arsenic, antimony, or bismuth, as a preliminary to its action on an infection due to a trypanosome or a spirochaete. Again we have evidence of an organotropic property of the remedy, as an essential condition of its activity.

4. *Resistant Strains of Trypanosomes.*

In the phenomena of the acquisition of resistance by a strain of infecting trypanosomes to a particular curative drug, discovered and largely worked out in Ehrlich's laboratory, we meet again with facts which can only with the greatest difficulty be reconciled with the assumption that the drug directly attacks the parasites. It was found, for example, that if a mouse infected with trypanosomes received an incompletely effective series of doses of atoxyl, the trypanosomes appearing in the blood at each relapse were more and more resistant to the drug, until they could not be caused to disappear by any dose of atoxyl which the mouse would tolerate. The strain, having once acquired this resistance, would retain it, on passage through an indefinitely long series of mice, without further treatment. Mesnil and Brimont, however, made the remarkable observation that if the strain of trypanosomes was transferred to a rat, it immediately became in that animal susceptible again to treatment with atoxyl, remained so as long as it was kept in rats, to reacquire its old resistance to atoxyl as soon as it was retransferred to mice. Such a fact seems to be not at all explicable on the theory that the directly active agent, to which the trypanosome becomes resistant, is a mere reduction product of atoxyl; it is much more easily reconciled with a mechanism such as that described by Levaditi, in which a constituent of the host's tissues enters into the formation of the trypanocidal substance. We can imagine the trypanosome becoming immune to Levaditi's mouse trypanotoxyl, and remaining susceptible to the corresponding rat product.

The whole question of this acquired resistance of the parasites to the action of curative drugs bristles with points of difficulty and interest. Ehrlich attributed the sensitiveness of the parasite, for a particular curative agent, to the possession by its protoplasmic molecule of a special form of side chain, or "chemoreceptor," which determined its affinity for that agent. When the trypanosome became resistant, it was simple to suppose that it did so by losing the appropriate chemoreceptors; an atoxyl-resistant

trypanosome, for example, had lost its atoxyl receptors. Apart from the objections already mentioned, this conception met a new difficulty, when in Ehrlich's laboratory it was found that the resistance was by no means as rigidly specific as it had first appeared to be. Not only imperfect treatment with atoxyl, but treatment with a particular group of dyes having no kind of chemical relation to it was found to produce a race of trypanosomes resistant to atoxyl and to other arsenical derivatives. To suggest that the chemoreceptors for arsenic and for these dyes are identical is merely to restate the fact of this reciprocal action in terms having no definite meaning. Obviously no more precise conception as to its significance can be formed until we know something more of the conditions on which resistance and susceptibility depend. A recent suggestion by Voegtlin has interest in making at least an attempt at interpretation in more definite biochemical terms. Voegtlin and his co-workers point out that arsenious oxide and its derivatives readily combine with substances containing a sulphydrile grouping, and find that the toxic action of the organic arsenoxides, on trypanosome and mammal alike, is depressed by the simultaneous injection of excess of various sulphydrile compounds.

III. Suggested Reaction of an Arsenoxide with a Sulphydrile Compound.

The work of Hopkins, showing the importance of one such sulphydrile compound—reduced glutathione—in the hydrolytic oxidation-reduction processes of the cell, suggests to Voegtlin that a combination with such groups, and consequent suppression of this vital function, may explain the toxic and curative actions of the arsenical derivatives, and that a formation by the trypanosome of the sulphydrile compound, in excess of its vital need, may be the basis of acquired resistance. If certain dyes similarly affect this cellular oxidation system, the production under their influence of strains of trypanosomes resistant to arsenic would also be explained. So stated the suggestion leaves many aspects of the problem still unconsidered; but it may at least be allowed the merit of an attempt to interpret the action of these drugs in terms of known biochemical facts.

IV. Emetine and Dysentery.

To turn to another example of a chemotherapeutic problem, I may mention briefly some results obtained, some years ago, by Mr. Clifford Dobell and myself, in an attempt to explore the curative action of emetine and the other alkaloids of ipecacuanha in amoebic dysentery, with a view to finding a more effective treatment. At the time when we took up the problem it seemed simple. Rogers had recorded that the amoebae obtained from a case of amoebic dysentery, and treated *in vitro* with emetine, were rapidly killed by the alkaloid in dilutions as high as one part in 100,000. This seemed to explain the action of emetine as a simple and direct one on the parasites, and to provide a rapid method for testing a series of compounds for their therapeutic possibilities. We failed, however, as other observers before and since have done, to confirm the observation; on the contrary, we found that the dysenteric amoebae, obtained from cats secondarily infected, or, in a control observation, directly from man, were surprisingly insusceptible to the action of emetine, living for hours in concentrations much greater than the highest which they would tolerate of other alkaloids, which had no curative action in dysentery. One of the other natural alkaloids of ipecacuanha, methyl-psychotrine, and certain artificial derivatives of emetine, were much more effective in killing the amoebae in the test tube, and at the same time were practically devoid of the characteristic toxicity of emetine and cephaeline for mammals and for man. Here, on the classical assumption of chemotherapy, should have been ideal remedies for amoebic infection—substances much more parasitotropic and much less organotropic than those already known to be effective. Yet each of them in turn, when administered to patients suffering from amoebic dysentery, in doses much larger than those in which emetine could be tolerated, produced no effect whatever on the dysentery, which promptly cleared up when emetine was subsequently given. Among the members of this group of alkaloids which were tried, the curative effect seemed to be proportional rather to their toxic and nauseating action on the patient than to their lethal action on the isolated amoebae. Yet emetine and cephaeline are not mere symptomatic remedies; they definitely stop the progress of infection by the amoebae, and, properly administered, eliminate them altogether from the body.

Yet another puzzling observation, made by Dobell and myself, was that an amoebic infection which readily yielded to treatment with emetine in man was entirely uninfluenced by emetine when transferred to the cat. In no way is it possible to account for these facts without admitting a co-operation of the patient's tissues in the curative action; nor, with that admission, can we do more than consider possibilities. We only know that the truly parasitic *Entamoeba histolytica*, which cannot live without invading the tissues, can be checked in this invasion and eliminated from the body by administering emetine, while other entamoebae, which live on faecal debris, remain unharmed. Whether the tissues are so altered that the amoebae cannot invade them, or the amoebae, without being directly killed, are so weakened in virulence that they cannot invade the tissue and obtain their food, but succumb in face of the normal resisting powers of the host, are possibilities on which we can only speculate, and no method of bringing them to the test of experiment has yet been found.

The work of Morgenroth and his co-workers, extending now over more than a decade, has again led them to emphasize, in connexion with the curative action of substances which they have examined, a fixation to the cells and tissues of the host, a definitely organotropic property, as an important factor in the effect. Two examples may be mentioned.

V. Quinine and Malaria.

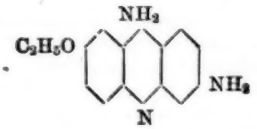
One of the earliest of chemotherapeutic discoveries, that of the cure of malaria by quinine, had never been satisfactorily explained. There was no evidence establishing even a probability that quinine, in such concentrations as can be tolerated in the blood of the living subject, would directly kill the malarial plasmodia, especially if these were partly screened from its action by their position in the interior of the red corpuscles. Morgenroth, from the results of his determinations by biological methods of the distribution of quinine in blood, is led to the conception of quinine as acting on malaria in virtue of its fixation by the red corpuscles, either killing the trophozoites in their interior, or blocking the entry into them of the merozoites of the asexual cycle. On this latter supposition it will be seen that quinine would act, not by killing the malarial parasites, but by rendering the blood unfitted for their multiplication. They are supposed to fall a prey to the natural defensive substances in the plasma, because a film of quinine denies them access to the red corpuscles, in the interior of which they could continue their development in safety. There are discrepancies between Morgenroth's determinations of the distribution of quinine in favour of the red corpuscles and those obtained by direct chemical means, which would still need to be reconciled before either theory of the curative process in malaria could be fully accepted. Meanwhile these suggestions are of interest as another example of the need found, more and more, by workers in this field to regard an organotropic property of a drug, not as detrimental to its curative action, but as an essential factor in the chemotherapeutic process.

VI. Remedies for Bacterial Infections.

This same property of fixing themselves to the red blood corpuscles or to the connective tissue has been observed by Morgenroth and his co-workers with the higher homologues of quinine, ethylhydrocupreine ("optochin") and octylhydrocupreine ("vuzin"), and with the dyes of the acridine series, with which they have obtained promising results in the treatment of bacterial infections. In the treatment of pneumococcus infections by optochin several factors other than those of immediately lethal action of the alkaloid on

the pneumococci appear to be concerned. Evidence was obtained by Moore, for example, which suggested that the defensive reaction of the host was an essential factor in the cure, optochin, in doses inadequate to kill the pneumococci, rendering them liable to the action of specific antibodies; and some experiments of Felton and Dougherty suggest that an excessive dose of an alkaloid of this class, by suppressing the natural defensive reaction, may even allow the fatal spread of an infection which a lower dose would cure. Morgenroth, on the other hand, emphasizes the part played by the organotropic properties of optochin and vuzin in enabling the red corpuscles to act as carriers of the drug to the point of action, and the connective tissues to form local depots of it.

An acridine dye, named trypaflavin, was under study in Ehrlich's laboratory in 1914 as a trypanocidal remedy, and was found during the war, by Browning and his co-workers, to have valuable properties as an antiseptic for infected wounds and mucous membranes, for which, under the name "acriflavine," it is still used. Since the war other dyes of this series have been investigated by Morgenroth and his school, and one of them, called "rivanol," is stated to be particularly effective as a tissue antiseptic, especially in conditions of spreading infection due to streptococci.



"Rivanol" (2-ethoxy 6, 9 diamino acridine).

In the case of "rivanol" also evidence has been brought forward that it is fixed by the red corpuscles and the subcutaneous tissues, protected thereby from excretion, or held at the point where its curative action is required. From these body cells it is suggested that the dye is gradually given up to the cocci, on which its action is exerted by a process called "transgression" by Morgenroth. This is a process by which a substance is passed from one medium to another, when both have strong affinities for it, through a layer of an intervening medium for which it has no affinity, and in which it may be almost insoluble. In this process of depot formation and gradual liberation of the active substance, we are concerned with a phenomenon which certainly has a widespread importance for chemotherapeutic action. We have earlier seen evidence of such fixation and gradual release in the cases of Bayer "205" and salvarsan.

Another suggestive feature of the action of "rivanol" on streptococcal infections is that such organisms as escape the immediately lethal effect of the dye appear to have lost their haemolytic properties and to have been modified into a relatively avirulent strain.

VII. Conclusion.

I have considered a few examples only of the directions in which chemotherapeutic investigation has proved practically fruitful, including some in which it shows, at the moment, the most hopeful signs of progress. If we consider any one group of investigations by itself, we may easily feel at the same time elated by the practical success obtained in the cure of some infection which but a few years ago seemed beyond the reach of treatment, and depressed by the disharmony between the results of experiment and the theoretical conceptions hitherto available of the nature of the chemotherapeutic process. Some of the most notable practical triumphs in this field have resulted, not from experimental investigations based on theory, but from an almost empirical trial, on human patients suffering from one type of infection, of a remedy which had experimentally shown promising results in infections of a different, and sometimes of a widely different, type. The partial success of tartar emetic in trypanosome infections might have justified a hope that it would have some effect in kala-azar, but hardly a prediction of its really remarkable efficacy in that previously intractable form of infection. Still less would it have justified expectation of the brilliant success of this same drug in infections by the schistosoma or bilharzia worm, which but recently seemed almost beyond the hope of any kind of treatment.

With such instances in mind one might, but a year or two ago, have been tempted to suggest that the attempts at theoretical investigation of the intimate mechanism of the chemotherapeutic process had contributed little to the practical achievements, and that a reasonably intelligent empiricism was still the safest guide. I do not think that the suggestion would even then have been defensible, and it would assuredly have been stultified by the results of the past few years. Patient, systematic exploration, by routes of which the initial sections were already mapped in the early days of chemotherapy, has in these recent years again led to results of major importance, both for practical therapeutics and for the theoretical basis of future advance. That the original theoretical framework begins to show itself inadequate for the expanding fabric is good reason for its reconstruction; but we may well beware of hasty and wholesale rejection, remembering that it served the early builders well.

I think it is especially encouraging to note that, though, in the action of almost every remedy which has proved its value in the specific cure of infection, there are features which cannot be interpreted by a strict application of Ehrlich's distribution hypothesis, the discrepancies begin to show a new congruity among themselves. Repeatedly we find phenomena which point to the need of modifying the theoretical structure in the same direction. The conception of a remedy not killing the parasites immediately, but modifying their virulence, or lowering their resistance to the body's natural defences; of a remedy not acting as such, but in virtue of the formation from it in the body of some directly toxic product, either by a modification of its structure or by its union with some tissue constituent; of an affinity of the remedy for certain cells of the host's body, leading to the formation of a depot from which, in long persistent, never dangerous concentration, the curative substance is slowly released—all these conceptions present themselves, again and again, as necessary for our present rationalization of the effects observed. It can hardly be doubted that they will potently influence the methods by which, in the immediate future, new and still better specific remedies are sought. But though our practical aim, in relation to the affinities of a remedy for the parasite and for the host's tissues, may be radically changed, the meaning of these specific affinities, so delicately adjusted to a precise molecular pattern, remains dark. Ehrlich's chemoreceptors may no longer satisfy us, but we have nothing equally definite to replace them. I have endeavoured to indicate what seem to me hopeful signs of new contacts between biochemistry and chemotherapy.

There is promise, in another direction, that at least some aspects of the problem of immune specificity are being brought within the scope of strictly chemical investigation, as in the recent work of Avery and Heidelberger on the constituent of the pneumococcus which combines with the specific precipitin. As in Ehrlich's pioneer work in chemotherapy, it can hardly be doubted that an increased understanding of the meaning of immune specificity, which but a short while ago might have seemed hopelessly beyond the range of attack by chemical weapons, will still influence ideas, and help to shape the course of further investigations, on the chemotherapeutic process. As the biological complexity of the problem is realized it becomes increasingly a matter for wonder and admiration that so much of practical value has already been achieved—the treatment of the spirochaetal infections, syphilis, yaws, and relapsing fever, revolutionized; Leishmania infections, kala-azar and Baghdad boil, and bilharzia infections, which crippled the health of whole populations in countries such as Egypt, now made definitely curable; trypanosome infections, such as the deadly African sleeping sickness, after years of alternating promise and disappointment, brought now at last within the range of effective treatment. And if such results have already been attained, in a period during which practice has often and inevitably outrun theory, we may well be hopeful for a future in which fuller understanding should make for more orderly progress.

THE RECOGNITION OF LATENT JAUNDICE DURING TREATMENT WITH ARSENO-BENZOL COMPOUNDS.*

BY

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Introduction.

The occurrence of jaundice as a complication of the salvarsan treatment of syphilis is now well known and its varieties have been closely studied. So far, however, the prime factor concerned in its causation has not been completely elucidated. In the medical literature of this country few references are available as to the actual incidence of salvarsan jaundice at the present time, but this complication is the most serious and frequent met with so far as the Royal Naval Medical Service is concerned.

It seems unnecessary here to discuss in any detail the work that has been done on jaundice following salvarsan treatment, since the whole matter is clearly and fully discussed in the recent report of the Salvarsan Committee of the Medical Research Council.[9] In that report three classes are recognized:

(*a*) *Early Jaundice.*—This occurs a few days after an injection. It is usually of a mild evanescent character, but may at times be more severe and persistent.

(*b*) *Late Jaundice.*—This comes on several weeks after the end of a course of treatment, and is more serious and prolonged than the "early" type.

(*c*) *Acute Yellow Atrophy of the Liver.*—This very fatal complication may occur at any time during the course of late jaundice.

At the Royal Naval Hospital, Haslar, 42 cases of definite jaundice following treatment by arsenic compounds have been investigated in the period from May, 1922, to March, 1923. During that time the total number of patients treated was 900. Of the 42 cases 30 could be classed as severe, and two deaths occurred; in both the histological changes in the liver were similar to those described by Turnbull[12] as characteristic of death from post-salvarsan jaundice. The remaining 12 cases were of the mild type.

On the advice of Dr. J. W. McNee the van den Bergh reaction has been used in all cases of syphilis undergoing salvarsan treatment as a routine method of detecting any variations in the bilirubin content of the serum during the course of treatment, in an attempt to throw light on the pathology of post-salvarsan jaundice.

The cases are classified as follows:

A. Primary syphilis (showing a primary sore).

B. Late syphilis (cases without any active lesions). All of these had already received one or more courses of treatment with arsenobenzol compound.

C. A few cases of chancroid, in which syphilis was finally excluded.

Scheme of Treatment.

For cases of primary syphilis (A) the total number of injections given was eight, the individual doses never exceeding 0.45 gram of novarsenobillon (N.A.B.). In certain cases, if the patient appeared very much below standard in general health, a smaller initial dose of 0.3 gram of N.A.B. was given, and the dosage thereafter gradually increased. Injections were given every third day until a total of 3.6 grams had been administered. The drug was at first dissolved in distilled water so that 0.45 gram was contained in 4 c.cm. of distilled water. The subsequent modification of this technique and the reason for it is given below. In cases of late syphilis without clinical symptoms (B) the total number of injections given in a course was six, each dose consisting of 0.45 gram of N.A.B., repeated every fourth day until a total of 2.7 grams had been given. The dilution was made in the same way as described above. Mercury was not given at all, but potassium iodide was prescribed for three weeks after each course of injections.

Observations on Cases.

This article is concerned with a series of 370 cases of syphilis undergoing treatment with novarsenobillon. The van den Bergh test was applied to all of these cases on admission, and again at intervals during the course of treatment. In as many cases as possible the test was again carried out at various periods after the termination of the course of injections.

In 281 cases no increase in the bilirubin content of the serum was found at any time. In the remaining 89 cases the bilirubin content was definitely increased as demonstrated by the test. In 67 of these on admission the number of bilirubin units was found to be less than 1—that is, was only slightly increased; in 22 cases examined on admission the number of bilirubin units showed a more marked increase, ranging up to 2.5 units. In these last cases, 22 in number, 17 were unaffected by a further course of treatment, but the remaining 5 showed a very definite increase again after the additional injections.

Particular attention has been paid to the series of 67 cases which on admission showed no increase whatever in the bilirubin content of the serum, but which, after a new course of treatment, showed interesting changes in the bilirubin titre:

21	cases	showed	an	increase	to 1	bilirubin unit.
24	,,	,,	,,		1.5	,, ,,
13	,,	,,	,,		2	,, ,,
3	,,	,,	,,		2.5	,, ,,
6	,,	,,	,,		3 and over.	

The six cases which showed an increase up to or over 3 units in the serum are the most important, because they may be taken as definitely demonstrating a latent jaundice. In four of them, as will be seen from the following brief notes of these cases, the latent jaundice soon became definite and overt. Careful examination of the blood serum was carried out at short intervals during the icteric stage, and a steady increase, and subsequent decrease during convalescence, was easily demonstrated by the test employed. Case 86 had already shown intolerance to arsenobenzol compounds three months previously, and had it not been for the information obtained of slowly developing latent jaundice by the van den Bergh test the condition of affairs could not have been discovered in time to prevent the administration of further doses of N.A.B. It was noted in all four cases that the jaundice only became obvious in the skin and mucous membrane when the number of bilirubin units in the serum reached a figure of about 4. This is in confirmation of the work already published by van den Bergh,[4] Lepehne (1920, 1921),[5] and McNee.[6]

Brief Notes of Six Cases of Late Syphilis showing Latent Jaundice.

Case 84.—The patient had had a course of novarsenobillon, followed by potassium iodide for three weeks. On admission there was no increase in the bilirubin content of the serum. On July 12th, 1922, there was an increase to 2.5 units; on July 15th to 3 units; on July 17th to 5 units (jaundice overt). On September 1st there was an increase of only 1 unit and there was no jaundice. Wassermann reaction positive.

Case 85.—The previous treatment of this patient consisted of three courses of novarsenobillon with potassium iodide for three weeks after each course. On admission there was no increase in the bilirubin units. On July 21st, 1922, the bilirubin content had increased to 2 units, and on July 24th to 3.5 units; glucose given. On July 27th the bilirubin increase was 2.5 units, and there was a trace of bile salts in the urine. Wassermann reaction negative.

Case 86.—This patient had previously been treated with novarsenobillon (one course, followed by potassium iodide for three weeks) and mercury. There was no increase in the bilirubin content on admission. On July 20th and 22nd there was an increase to 3 units; glucose was given on the later date. On July 25th the bilirubin had increased to 4.5 units; there was faint overt jaundice, and bile salts and pigments were present in the urine. Wassermann reaction positive. Three months previously, at the end of the course of novarsenobillon, the patient had rash and pyrexia.

Case 87.—Previous to admission this patient had had three courses of novarsenobillon, each course followed by potassium iodide for three weeks, and mercury treatment. There was no increase in the bilirubin content on admission, nor on examination on July 14th, 1922. On July 16th, however, there was an increase to 3 units; glucose given. On July 18th the bilirubin content had increased to 3.5 units, and there was a trace of bile salts in the urine. Wassermann reaction negative.

Case 88.—The previous treatment in this case consisted of four courses of novarsenobillon with potassium iodide for three weeks after each course. On admission there was no increase in the bilirubin content of the serum. On September 13th, 1922, there was an increase to 2.5 units, and on September 15th to 4 units; glucose given; bile salts and pigments were present in the urine.

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On September 16th there was a further increase to 6 units; overt jaundice. On September 21st the increase was 4 units, and on September 24th 3.5 units. Wassermann reaction positive.

Case 89.—The patient had had two courses of novarsenobillon, each course followed by potassium iodide for three weeks. No increase in bilirubin content on admission. On September 20th, 1922, there was an increase to 3 units, and the following day to 4.5 units, with faint overt jaundice. On September 23rd the increase was 3.5 units; the urine contained a large quantity of bile salts, and bile pigments were faintly present. On September 29th the increase was 2 units. Wassermann reaction positive.

The question of alteration in the bile pigment metabolism during salvarsan treatment was found, during the course of the present observations, to have been in part investigated already by Strauss and Buerkman,[11] who also studied cases treated with arsenic compounds only, and not with mercury. In a small number of cases of primary and secondary syphilis undergoing salvarsan treatment a definite increase of bilirubin in the serum was found, but the writers concluded that the increase could be put down to the effects of the spirochaetal infection rather than to the use of the drug. In cases of late syphilis which had already undergone extensive treatment with arsenobenzol compounds Strauss and Buerkman again found an increase in a small number of cases.

Strauss and Buerkman.—48 cases: all late syphilis. Increased bilirubin in serum—6.2 per cent. of cases.
Present Series.—370 cases: 85 per cent. late syphilis. Increased bilirubin in serum—24 per cent. of cases.

With a view to comparing the results obtained at the Royal Naval Hospital, Haslar, with those of another institution, the writer was fortunate, through the kindness of Dr. A. M. H. Gray of University College Hospital, London, in being allowed to apply the van den Bergh test to 50 patients undergoing treatment there with N.A.B., mercury, and potassium iodide. The course of treatment was more prolonged but less intensive than that adopted at Haslar. The cases were chosen at random, and although no example of latent jaundice becoming clinically obvious was observed an increase of bilirubin in the serum was noted in 15 cases.

Modification of Treatment.

Since it seemed possible that the concentration of the solution of N.A.B. used at Haslar might be a factor leading to the frequency of post-salvarsan jaundice, either latent or overt, 0.45 gram of N.A.B. was dissolved in 10 c.cm. of distilled water instead of in 4 c.cm. Since the introduction of the more dilute solution a much smaller number of cases have shown a rise in the bilirubin content of the serum after a course of injections.

The value of glucose as a protector of the liver cell against various poisons has been shown by Graham[3] and by Davis and Whipple,[2] and is now in fairly general use as a preventive of the hepatic complications of syphilis treated with salvarsan. It was employed in all the cases of the present series where an increase of the bilirubin content of the serum was made out, and I believe that this prompt administration of glucose may have been the means of preventing the cases in which slight latent jaundice was recognized from developing a more serious type of liver injury on the continuance of arsenical treatment. The method of administration of glucose employed was that recommended by Maclean,[6] and as now carried out by Colonel Harrison at St. Thomas's Hospital.

Subsequent History of Cases Investigated.

Through the kindness of Surgeon Commander Parnell, R.N., I have been able to investigate the subsequent history and treatment of 40 cases recorded in the series. Three men have received a further course of treatment with N.A.B., and one of these developed definite jaundice two months afterwards. None of the six cases referred to as showing latent jaundice has received further N.A.B. treatment, but all of them have been given intramuscular injections of metallic bismuth cream without untoward results.

Other Methods of Estimating Hepatic Insufficiency.

The opportunity was taken of examining some of the other accredited methods of recognizing disturbances of hepatic metabolism and comparing them with the results obtained by the van den Bergh test. The methods made use of were the following:

1. *Widal's "Haemoclasic Crisis" Test.*—This test, described by Widal, Abrami, and Iancovesco,[13] has been extensively employed in the past few years, and many publications are available dealing with the results obtained. A critical review by Lepehne (1924)[5] deals very fully with this test and its possible value. Ninety cases of the present series have been investigated simultaneously by this method and by the van den Bergh reaction, and the results seemed to discount the haemoclasic test being of any definite diagnostic value. No correspondence was ever made out between the changes of the leucocytic count and the amount of bilirubin in the blood serum. This agrees with Lepehne, who has also concluded against the test as an indicator of impaired hepatic function.

2. *Laevulose Tolerance Test.*—This has been carried out only a few times, being given up because it was found to be too time-consuming for routine work. The method used was that published by Spence and Brett.[10]

3. *The Lipase Test.*—Here again only a few cases have been examined, using the technique of Lowenhart. It was found that the test also required too long a time for routine work, and the results obtained were also inconclusive. It must be noted, however, that Mackenzie Wallis[7] places considerable reliance on this method as an indicator of disordered liver function.

4. *Enumeration of the "Haemoconia" in the Blood.*—This test was applied to a very considerable number of the cases in the series, being easily carried out and not requiring a great deal of time. The test has been recommended by Brulé and Lemierre,[1] and consists in a study of the particles in the blood seen under dark-ground illumination before and after the ingestion of a meal containing an abundance of fat. The test proved of no value in detecting mild degrees of impaired hepatic function.

Some interesting observations have been made in the series of cases on the disturbance of different parts of the bile metabolism following the injections. The urine was regularly examined for bile salts, using a modification of the Hay test. In many cases in which no excess of bilirubin was present in the blood serum, bile salts were detected in the urine, although generally in small amounts. In the definite cases of jaundice a dissociation, such as has been studied by French workers, was not infrequently detected. Bile salts continued to appear in the urine for several days after the bile pigments had entirely disappeared.

Summary and Conclusions.

1. The test of Hijmans van den Bergh has given an added interest to the study of the condition known as post-salvarsan jaundice, and additional points in the pathology of the condition have been revealed by its application. The present investigations have been fairly extensive, and the van den Bergh test has clearly demonstrated its great value to the individual treating cases of syphilis by N.A.B.

2. The specialist in venereal diseases requires a practical, rapid, and easily applied test to enable him to control his dosage of arsenic compounds and to warn him of approaching dangers which cannot be discovered by mere physical examination of his patients. It seems that in the van den Bergh test we possess a very useful means of detecting with certainty the condition of "latent" jaundice. This is a point of great importance. It has been found that the laevulose tolerance test and the serum lipase test, as means of detecting impaired hepatic function, cannot be employed in a daily routine manner where large numbers of cases are being dealt with; they are much too time-consuming. The haemoclasic crisis test would seem to be altogether unreliable. The laevulose tolerance test has undoubtedly proved of value in demonstrating impaired hepatic function after treatment by arsenobenzol compounds, but the individual treating syphilis must necessarily be more interested in a method which is of assistance to him in controlling treatment and in detecting the gradual development of the earliest signs of disturbed hepatic function.

3. The fact that "latent" jaundice can be detected by the van den Bergh test is a great advance towards some scientific control in the use of a dangerous drug. "Latent" jaundice is a danger-signal of the possible development of a far more serious condition. The course of a case of post-salvarsan jaundice, however mild, cannot be predicted, and it therefore behoves us to take all possible steps to eliminate this complication. As soon as a condition of "latent" jaundice was detected arsenical treatment was at once stopped and glucose given freely. It

seems probable that this procedure prevented the subsequent development of a much more grave disturbance of hepatic function.

4. The van den Bergh test is simple. It is the most rapid and most easily applied of all the tests applicable to the investigation of disturbed hepatic function, and, with experience, is reliable. The results obtained are accurate enough for all clinical purposes, although no colorimetric method of this kind can pretend to more than approximate accuracy.

5. It is suggested that the van den Bergh test, if used as a routine in cases of syphilis undergoing treatment by arsenobenzol compounds, affords a strong safeguard against the development of the grave condition of post-salvarsan jaundice, fatalities from which are more frequent than general mortality statistics would lead one to believe. The small amount of serum necessary for the test is readily obtained when taking the blood for the routine Wassermann reactions.

Acknowledgements.

My special thanks are due to Dr. J. W. McNee, Medical Unit, University College Hospital, under whom I studied the technique of the van den Bergh test, and who has frequently controlled the results obtained in the cases included in this investigation. I am indebted to Surgeon Commander T. Creaser, R.N., for the use of the laboratory; to Surgeon Commander R. Parnell, R.N., for his constant interest and kindness in allowing me access to subsequent records of treatment carried out by him; and to Surgeon Commander Page, formerly urological specialist at Haslar. To S.B.P.O. A. H. Meguijer, R.N., and the laboratory staff I express my thanks for valuable assistance. Finally, I have to acknowledge a grant towards the expenses of the work from the Medical Research Council, and express my gratitude to the Director-General of the Medical Department, R.N., for permission to publish this paper.

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POSTURE IN DIFFICULT LABOUR.

BY

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MOST of the devices by which we reduce the difficulty of labour have been practised, at least in kind, for thousands of years. Used at first empirically and promiscuously, the mode of operation of many of them has been made clear and the indications for them precise, and it is now possible to employ them scientifically.

The official postures, such as that on the long popular delivery stool or, in this country, the left lateral position, found justification in their convenience for rendering service at the delivery, but the need of allowing them to be varied was recognized for individual cases. A "hanging leg" posture was described and figured by Scipio Mercurio at the end of the sixteenth century, but, though he mentions compression and checking of the bones of the pelvis as a source of difficulty, he did not recognize the position as specifically adapted to that difficulty, but to labour that is difficult "from what cause you will." This "Mercurio" posture has legs and also shoulders lower than the pelvis, and he explains that in this position, with the shoulders low, it is easy for the midwife to reduce a badly placed child to the mid-line, whereas the shoulder high position on the delivery stool tends to make the malplacement worse.

The distensibility of the symphysis pubis in pregnant women was long a subject of dispute. Ambroise Paré and Severinus Pinaeus separately report their presence in February, 1579, at the autopsy of a woman of 24 years, who had been hanged for child murder ten days after her delivery. It was demonstrated by sight and touch to all who were present that the pelvic bones were so mobile that the end of one pubic bone could be raised half a thumb-breadth above the other. Some, indeed the greater crowd, of the spectators "stiffened their necks" and adduced arguments against its possibility, but the facts have forced recognition, especially in the operation of section of the symphysis. It was not recognized that this mobility of the bones could be called upon by the posture of the patient to reduce the difficulty of labour in a narrow pelvis until in 1889 Walcher reported that in six cases, by putting the woman with a cushion under her sacrum and her legs hanging, he had secured an increase of from 8 to 13 millimetres in the conjugate diameter of the brim. Since that time the hanging leg position has become one of the resources of the scientific obstetrician and is often titled the "Walcher" position. The mechanism of the manœuvre is simple. The sacrum being held by the spine and by the upward pressure of the cushion, the pull of the legs on the acetabula in the opposite direction carries the front part of the pelvis down and lengthens the distance between the symphysis pubis and the promontory of the sacrum.

Obesity was recognized by most of the ancient writers as a source of difficult deliveries. Mercurio discusses it at some length and recommends: (*a*) reduction of the diet by a third during the last two months of pregnancy, thus forestalling Prochownik; (*b*) medicines; (*c*) posture; (*d*) manipulation. The posture which is described and illustrated is an exaggeration of the hanging leg posture, such that it has been ridiculed as scarcely tolerable even for an acrobat. This posture is almost exactly represented in a figure brought by the excavators from Ur, and it is highly probable that there is an Eastern strain in the line of tradition leading to the formal description of the hanging leg position. Mercurio refers to Avicenna, but the hanging leg position does not come directly from that author.

The posture which the ancient writers prescribed for the delivery of obese women was that on knees and face. This can be traced from Soranus, through Aetius, on to Eucharius Rösslin. Avicenna directs that the fat woman lie with her knees under her belly and her head on the ground, and have her vulva anointed and opened with the fingers; when this is done, he says, she will bear quickly in the mode of quadrupeds. He prescribes the dorsal position with the legs raised, when it is necessary to douche the passage with lenitives, and when it is necessary to open the vulva with instruments he says it may be tried in the ventral posture or in the dorsal or otherwise. It is obvious that in these prescriptions the chief consideration was the facility of manipulation.

The ventral postures are, however, not an invention of the erudite, but are found widely distributed among primitive peoples as an aid in prolonged labour. The mechanical effect of these postures seems to have received little attention. In the knee-face and the knee-chest positions the disposition of the forces acting on the pelvis is the same in kind as in the ordinary hanging leg position. In each a backward force acts on the acetabulum—in one case a thrust, in the other a pull from the femur—and in both the tendency is to carry the anterior part of the pelvis downwards in relation to the posterior. I have not at present the opportunity of making a series of measurements to determine the relative lengthening of the conjugate at the brim which results from the various postures, and so commend this observation to any who are more fortunate. In practice, the hanging leg position has proved so irksome to the patient that it has not always been possible to maintain it for a sufficient time. The knee-face posture is much easier, as is obvious from its being so often spontaneously adopted. Should it be found that the measure of its influence approximates to that of the hanging leg posture it would offer a valuable aid in the slightly narrow pelvis.

British Medical Association.

PROCEEDINGS OF SECTIONS AT THE ANNUAL MEETING, BRADFORD, 1924.

SECTION OF PUBLIC MEDICINE AND INDUSTRIAL DISEASES.

HERBERT JONES, L.R.C.S.I., D.P.H., President.

PRESIDENT'S OPENING REMARKS.

THIS is the first Annual Meeting at which the public health service, as represented by the Society of Medical Officers of Health, has been formally admitted to your Representative Meeting and to your Council, and there is reciprocal representation of the Association on the council of the Society. For many years the Association has concerned itself with the interests of the public health service, on whose behalf much time, thought, and treasure have been expended by the Association. The Society had been engaged in similar work, though the two bodies, while having the same ends in view, have not always travelled along parallel lines. There had been of late years a tendency in some quarters to make a sharp distinction between curative medicine and preventive medicine. In my opinion there should be no such distinction, and if in this Section we can indicate to the general practitioner and to the medical officer of health the way in which each can be of service to the other we shall have set a distinctive mark on the meeting which may serve as a milestone on the broad highway along which the whole profession is journeying. The first medical officers of health appointed were of necessity drawn from the ranks of the general practitioner. This was the case even in those posts which were of a whole-time character, and it is instructive to recall that the majority of the early whole-time posts were in rural areas, several districts combining to make this financially possible. The holders of these posts were real pioneers whose names will always be held in reverence. There were Franklin Parsons, Bruce Low, Thursfield of Shropshire, Kelly of Kent, George Wilson of Warwickshire, George Turner of Hertfordshire, and Woodforde of Berkshire, masters of their craft, whose successful achievements were largely due to the fact that they were conversant with the difficulties of the general practitioner, and faithfully upheld the traditions of their order. The mention of Franklin Parsons and Bruce Low serves to remind us that for a long period the medical service of the Local Government Board was recruited from the ranks of medical officers of health, whose administrative experience and insight into the idiosyncrasies of local governing bodies were invaluable to the central authority. These pioneers had much to contend with. They had to teach the people, gently but firmly, that the laws of health must be complied with, and that in certain particulars the Legislature had made that compliance obligatory by Acts of Parliament. It has been wittily said that the earliest Public Health Acts were regarded from various standpoints as a new-fangled way of wasting money, as an unwarrantable interference with the liberty of the individual, as an impious encroachment on the prerogative of Providence, and as a convenient way of spiting a neighbour. Some of us have still to combat these views, but our task is light compared with that of our predecessors. How successful these were in laying the foundations of reform is now an open book. Preventable disease has been lessened, infantile mortality reduced in a remarkable degree, while our expectation of life has been so markedly increased that, whereas at the end of the last century a favourite topic for newspaper discussion in the silly season was, "What shall we do with our boys?" these boys are now anxiously inquiring, "What shall we do with our grandfathers?" Though the public health service has cause to be proud of its achievements, it cannot take to itself the entire credit for the results attained. The marvellous and, indeed, astounding triumphs of the physician and surgeon in the realms of diagnosis and treatment are completely recognized in the public health service. Nor must we forget the scientific investigator patiently plodding in his laboratory, without whose aid we might still be taking timorous leaps in the dark, hoping for the best but uncertain of the issue. When considering the topics to be discussed in this Section it seemed to me and to my colleagues the vice-presidents and secretaries that the time was particularly appropriate to turn our attention to those subjects which would bring to the forefront practical suggestions for the complete and intelligent co-operation of the general practitioner and the medical officer of health, and the manner in which one can best assist the other. The aim of both is the welfare of the whole community, lightening burdens and making existence more tolerable; in the words of a great English novelist, "What is life for if not to make the world less difficult for one another?"

DISCUSSION ON THE ROLE OF THE GENERAL PRACTITIONER IN PREVENTIVE MEDICINE.

OPENING PAPER

BY

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IN dealing with the place of the general practitioner in preventive medicine I propose to take a wide view of the meaning of the word "preventive," and not to restrict it to its relation to the work of the departments of the public health.

In Brend's book *Health and the State*—which, despite some questionable statements about the medical side of national health insurance work, I would like to commend to every person interested in the public health or in the progress of medicine—he points out that preventive medicine is of ancient standing, and this is in some ways true. In the Mosaic laws there are many sanitary measures, and, while some of them are concerned with various incantations and sacrifices, some are in accord with modern ideas; and in the Middle Ages most European countries had laws dealing with sanitation, adulteration of food, etc. The punishment seems to have best fitted the crime in Germany, where there is an account of an adulterator of wines being condemned to drink six quarts of his own wine, from which he died. Nevertheless, in ancient times up to and through the dark ages, preventive medicine consisted mainly of priestly incantations and laying on of hands, and real effective prevention is a growth of the past fifty years or so.

While, then, the practice of medicine goes back into the forgotten past without a break, that practice has been in the main the practice of cure. Sir George Newman, in his monumental memorandum *On an Outline of the Practice of Preventive Medicine*, begins with these words: "The first duty of medicine is not to cure disease, but to prevent it." Had Sir George Newman said that this ought to be its first duty all must agree, but as the words stand they are almost exactly the opposite of most of the practice of the past, as of the present, for most medical practitioners devote their lives to the cure of disease already there, and not to its prevention.

Speaking of things within my own experience—if I find a cataract I remove it. I cure the blindness which the cataract causes. If I find a collection of pus in the cells of the bone behind the ear, and this affects hearing or threatens life, I secure an exit for that pus, and so cure, or endeavour to cure, the deafness it causes; this sort of thing is my function in life. It is not part of my direct function to prevent the advent of the pus, or to prevent the advent of the germs which give rise to that pus, or so to organize the functioning of the body that on the advent of such germs they may receive short shrift. I may take action which has this result, but I do this, so to speak, unofficially. In other words, my function in life is not the prevention of disease, but its cure, and until quite recently this has been the function of almost all practitioners of medicine in this country and in all

countries inhabited by white races, and is still the function of most of them other than those engaged in public health or research.

Why is this? The answer is obvious, and it is that the economic demand on the medical profession has, until recent years, been entirely a demand for cure, and, with the vast majority of the profession, still is a demand for cure. Speaking in terms of economics, we are the employees of the people who pay us our fees, and in the main we perform the task they set us to perform, and on the whole that task is to cure or to try to cure, and that is what we are paid to do. It is only within recent years that we have begun to prevent, and it is still more recently that we have been asked to prevent and some of us paid to prevent.

A result of the outlook which I have described is that until comparatively recently we received our emoluments from people who were ill—a highly unstable position, for it meant that we obtained fees from our clients at just the time when they were least able to afford them, a state of affairs so unstable that in the case of those people who are without reserves of property (and they are the vast majority) the arrangements broke down and the need had to be met in other ways. As a semi-charity came the inception of a new aspect of the problem of the supply of medical services—that of insurance, not so much against illness as against the cost of the cure of illness and of maintenance during illness; and the club system arose. This is not the place to discuss whether this system represented an advance or not, but for the purposes of this paper I would like to point out that it somewhat shifted the economic outlook. The club doctor was paid by capitation fee, and his income depended on the number of members in the club, and not on the amount of work he did for them.

I was interested to hear this point raised at the Representative Meeting last year, in the discussion on the National Health Insurance medical work, when one of the representatives aroused a storm of protest by saying that the interests of the private general medical practitioner were by no means identical with those of the panel practitioner; for the direct interest of the panel practitioner was to have less disease among his insured patients, and accordingly less work, while the direct interest of the private practitioner was to have more disease, and, therefore, more work. Crudely put, the statement is liable to be misunderstood, and was met with a storm of angry protest; but the prejudice was unreasonable, for the logic of the representative was unassailable. As a matter of economics it is to the interests of the private practitioner that there should be more disease and not less, and it is only because there is no such entity as the economic man, and because men, not being economic men, "do not live by bread alone, but by every word that proceedeth out of the mouth of God," that the private practitioner does endeavour to prevent disease and often with success; and certainly does not desire to see more disease in the world.

In 1912 the club system was enlarged on a grand scale into the National Health Insurance Medical Service, and this greatly changed the economic outlook of medical practice. Previous to this time club practice had become, in part at least, so degraded that it was becoming a diminishing factor in the medical service of the country; but now about one-third of the medical service became contract work, the principle of which is "pay when well, receive when ill"—under which it is the interest of the medical man to have his patients remain well. I cannot accordingly but regard the advent of the National Health Insurance Medical Service as giving incentives for preventive work which did not previously exist, and, though the effect may not as yet be very great, I have no doubt it will become greater.

With this preamble I now propose to deal with my subject under several heads.

1. *What are the Present Activities of the General Practitioner which tend to the Prevention of Disease?*

By far the most important of these comes from his being the first to deal with disease already present, and on his being accordingly able to treat it in its early stages; the result being that often he is able to prevent acute from developing into chronic disease, and by treating disease effectively in its earlier acute stage he is able to prevent more or less serious complications. Examples are obvious: An acute Bright's disease treated early is prevented from becoming chronic Bright's disease. The early treatment of influenza saves the victim from pneumonia. Indigestion dealt with early may be got rid of before a duodenal ulcer develops. The early treatment of a trivial wound prevents the onset of serious blood poisoning.

Macleod Yearsley has in recent years written several illuminating articles on the prevention of deafness. He points out that, while the "cure" of deafness when well established is usually a hopeless matter, the prevention of deafness is often an easy matter. But the initial steps which will in the individual case lead to this prevention are almost entirely in the control of the general medical practitioner. He is the medical person first called in to advise about deafness, or the inflammatory process which results in deafness, and on his prompt action depends the momentous question as to whether the cause of the deafness can be removed before organic change takes place which will make removal impossible. Prompt action in inflammatory middle-ear disease usually results in satisfactory or normal hearing. Failure to take prompt action results in loss of hearing. Here the specialist is powerless: the general practitioner is all-powerful. The prompt action must in the first instance be his. But, further, the general practitioner has power to prevent deafness before it is present at all, for it is he who first has the opportunity of observing whether the patient—in this case the young child—suffers from conditions, such as nasal obstruction, which are liable to produce deafness, and it is as the result of his prompt recognition of these conditions, and prompt action resulting from this recognition, that not only deafness but danger to health and to life may be prevented.

I have enlarged on this example as one coming within the scope of my own work, and it is with pleasure that I recognize that in my experience the general practitioner has become increasingly alive to his opportunities in this respect; and though a general statement is dangerous, as the observation of one person must be too limited to warrant it, it is my belief that with the National Health Insurance the work of the general practitioner has improved in this respect. Space does not permit me to multiply examples, but the aggregate effect of this indirect prevention is great, and there has been an interesting result in connexion with the National Health Insurance work. An effect of the substitution of contract work, where a service received does not mean the expenditure of a fee, for private practice, where the service involves a fee, has undoubtedly been that the doctor sees his cases earlier, and sees more trivial things; and in my opinion the preventive effect of this is one of the reasons why the actuarial estimates of duration of sickness have been upset and the sickness incidence has been so much less than that expected that the accumulated reserves of the National Health Insurance funds have become as large as they have been found to be.

Other activities which have preventive effect are such as the notification of infectious diseases, the vaccination of contacts in cases of small-pox, the vaccination of babies, the early treatment of venereal disease and its early reference to venereal disease clinics, and the prophylactic administration of antitoxin in diphtheria contacts. Ophthalmia neonatorum was becoming relatively rare until the war seemed to restore it to or beyond its former scale, but its dreadful ravages have been reduced and so blindness prevented by the care of the general practitioner at childbirth and early treatment if the disease appears. By advice about general hygiene much disease is prevented, and often advice given by the family doctor in the case of members of the family not obviously ill has been invaluable in the way of avoidance of illness. Advice given during an illness may have an important effect in the promotion of health subsequently and the prevention of ill health. The lesson a patient or his family receives on the value of the open window in pneumonia has had effect in opening windows and keeping them open after pneumonia has gone.

2. *How is the General Practitioner Failing to Take Advantage of the Opportunities he has at Present to Promote the Prevention of Disease?*

On the above and on cognate lines, examples of which everyone can multiply for himself, the general practitioner is doing admirable preventive work; but on other lines he is failing to promote prevention of disease where his influence might be great, and I believe that this failure is because it is not his first duty to prevent disease, as Newman appears to say, but to cure it.

I suppose there are none of us who would challenge the statement that a bad environment is a cause of disease, and that in such cases prevention involves a change of environment. But not only is a bad environment a cause of disease, and its removal a *sine qua non* for the prevention of such disease (which is not directly the business of the general practitioner), but a bad environment is also a potent influence in hindering the cure of disease, and as such it is the general practitioner's direct concern. Bad housing conditions not only promote pulmonary consumption, but they also interfere with its cure. Pollution of the atmosphere by smoke not only promotes rickets, but its presence markedly hinders its cure. Excessive hours of work, bad conditions of work, overcrowding in houses, overcrowding of houses, adulteration of food, alcoholic excess, conditions which promote alcoholic excess, are not only factors in promoting disease, but in hindering cure, and so are the concern of the general practitioner, directly as well as indirectly.

Brend discusses the various alleged causes of infantile mortality, which is taken generally to be an index of the public health. Some of these are poverty, defective sanitation, industrial employment of women, bottle-feeding, the absence of skilled attention in child-bed, maternal ignorance, influence of pre-natal conditions, etc. He points out that none of these can be the chief cause, as they none of them invariably accompany infantile mortality. The chief cause, for instance, cannot be maternal ignorance, despite Sir George Newman's dictum that "the principal operating influence is the ignorance of the mother, and the remedy is the education of the mother"; for I for one am not going to believe that the wives of agricultural labourers and shepherds are so much less ignorant than the women of Bradford, where so much has been done to promote instruction of mothers. The one constant factor that seems to accompany a high infantile mortality is a smoky and dirty atmosphere. Accordingly, infantile mortality (and let me again remind you that infantile mortality is taken, and, I believe, rightly taken, to be an index of the public health) is largely due either to smoke pollution or to some other cause, or congeries of causes, which is not yet established, and to ascertain which research is urgently needed.

Let me take another example. Macleod Yearsley has pointed out that the chronic running ear—the overwhelming occurrence of which is the bugbear of every school clinic and the nightmare of every otologist—is the outcome of poverty and evil housing conditions; there is no gainsaying this.

What has all this to do with the general practitioner and his place in preventive medicine? you may ask. Let me take the matter of smoke prevention for my answer. The only reason why smoke pollution of the atmosphere continues is because public opinion does not call for its prevention; were public opinion aroused to prevent it, it would disappear. To science the prevention of the smoke nuisance presents no difficulty, nor is there any difficulty for the economist. To purify our atmosphere from smoke would certainly mean economic gain, not loss. Why does it persist? Purely through ignorance and apathy, and because, as Dickens pointed out over sixty years ago, the object of Governments is "how not to do things." Governments can only do things when public opinion allows them to do them or forces them to do them; and here is a place for the general practitioner in preventive medicine. He has a better opportunity for observing the disaster of bad environment than any other member of the community; he has, or ought to have, the skilled eye to see the effects as no one else can. It is his privilege, accordingly, as well as his duty, to be in the forefront in the creation of that public opinion which will sweep that environment away. But what is he doing to form such public opinion as will reach out towards the new social order? I fear the only answer is, nothing, if it is not worse than nothing.

In Parliament and on local authorities the influence of the medical profession is negligible, and for this state of affairs the general practitioner cannot be regarded as free from blame; he has failed to take advantage of his unrivalled opportunities to create public opinion.

3. *What should be Aimed at in the Near Future to Gain for the Community the Full Advantage of the Opportunities the General Practitioner has to Promote the Prevention of Disease?*

(*a*) If the general practitioner prevents disease, as I have above pointed out that he does, through early treatment of acute disease, obviously the effect of his work will be greater the better he is able to do the curative work, which is the function for which there is economic demand; and I have already indicated that in a bad environment he cannot do effective work. We have to realize that where people urgently need fresh air, rest, good feeding, etc., medical treatment can do little for them so long as their environment remains unchanged. This change depends on the growth of a public opinion which will demand it, and in the foregoing portion of my paper I have dwelt upon this sufficiently. Such growth of public opinion will be slow, but there is one change in environment for which public opinion is ripe, and were the medical profession to demand it with no uncertain voice the ways and means for the change would readily be found.

If we agree that the profession is doing a great preventive work by the early treatment of acute disease, and by the effective treatment of it, it is obviously necessary for the best results that the medical practitioner should have his patient in the best available surroundings to get him well quickly. This, then, raises the question of the proper place in which to be ill, if we have to be ill at all; and I venture to state quite dogmatically that, generally speaking, houses built to live in are not suitable to be ill in. There is a story told of Sir Frederick Treves and King Edward that when he had operated on the King for appendicitis he told him, on his recovery, that he had been as well treated as if he had been a poor person in a London hospital. If the story is not true, it ought to be.

But if houses are not suitable to be ill in, the general practitioner cannot do his best work if he has to treat his patients in them. To obtain his best from him he must have hospitals in which to do more if not most of his work. We of the middle class are increasingly finding out, for instance, that childbirth is in every way safer and more convenient in a nursing home than in a private house, even when that house is relatively commodious; the nightmare of midwifery practice in a workman's cottage with even two or three bedrooms is good neither for the mother, nor the child, nor the doctor, nor the community.

The provision of hospital beds in this country is grossly inadequate to the needs of the community; it seriously handicaps the general practitioner's powers to treat disease, and in the proportion that it handicaps such powers in at least that proportion it lessens the effect of his work in preventing it. The late Sir Napier Burnett stated that the needs of the community could not be met by less than three hospital beds per thousand of the population in urban areas, and this estimate has never been seriously challenged, except that it is on the low side. Present hospital accommodation is about one bed per thousand of the population.

This is not the place to consider whether the voluntary system, which is hard put to it to make ends meet, can be so extended as to meet the real needs. But the provision of adequate accommodation is an urgent matter, and could this be brought home to the people a solution would be prompt. The appeal to the intellect, however, has small effect compared with that to the emotions. As Brend says: "Many who would spare no effort to help a person injured in the streets before their eyes, will read quite unmoved a statement that the hospital provision in England is seriously inadequate." In all seriousness I suggest that

the best way to find a solution would be to shut our hospitals down. Three months would give the solution, and I suggest that the general practitioner could help towards it.

(*b*) Apart from the question of environment in the treatment of disease, the community might gain from the general practitioner a further degree of attention to prevention of disease by giving him an economic demand for it. I have indicated that the National Health Insurance Medical Service does to a certain degree make this effective demand indirectly, for it is to the interest of the insurance practitioner to have his clients well. But if this be so, it affords but another reason for the ending of the absurdity that about one-third of the people of the working classes should have their medical service supplied to them through State agencies, and that the other two-thirds, belonging not only to the same class but to the very same families, should have no national provision whatever. Were it not outside the purview of this discussion, one might ask the question: What can you think of the intellectual capacity of the persons called statesmen who set up a medical service for a father, but not for his wife or his children? And one might ask what possible relation the question of employment can have to the provision of such service. But if the present National Health Insurance medical work has had an effect of prevention, giving as it does medical service to one-third of the working-class people, this preventive effect would probably increase in a much greater proportion by extension to the other two-thirds. Twice one is not always two—it is often far more than two; and the preventive effect of a National Medical Service (I use the term because a State Medical Service would probably be misunderstood) would certainly be far greater in the case of children than of adults were it extended in such a way as to secure a contented and, therefore, an efficient service.

(*c*) The demand for prevention here would still be indirect, and I would now like to raise the question whether a direct economic interest in prevention could be given to the general practitioner. My knowledge of the work of Pensions Medical Boards is slight, but it is enough to lead me to the conclusion that such direct interest could be given; but whether public opinion is prepared to avail itself of the opportunity is possibly more than doubtful. At these Pensions Boards the examination of the persons who come before them is thorough to a degree. An examination for an injury of, say, an extremity involves an exhaustive examination of the whole body, and I believe that it will be found to be the universal experience of Pensions Boards that at an examination for one object other factors have often been discovered, attention to which has had the greatest effect in the prevention of illness. Could this idea be extended to the community generally, or even to the insured person, for whom national provision is already made? It would involve extra cost, for it would involve an increase in the medical work done for the insured person by between one-third and one-fourth, but evidently the chief difficulty would be in the training of the people to take advantage of it. Were the difficulties overcome, the advantages of periodic examination by boards, consisting largely of general practitioners who would soon become skilled examiners, might have great preventive effect; and examples are so obvious that I propose to occupy neither time nor space in giving them.

4. *How is the General Practitioner Linked up with the Departments of Public Health?*

When I planned my paper I proposed to consider the question of (*a*) how the general practitioner is now linked up with the departments of the public health; and (*b*) what could be done to make the link closer and better; but exigencies of space will not permit more than a mere reference to it. I would, however, like to make the plea that, in the encroachment the local and national public health authorities are continuously making on the domain of the general practitioner, as in the treatment of school children, etc., the maximum use should be made of the general practitioner in this work, and not the minimum.

The advantages to the local authority of the whole-time official are obvious on the surface: he makes administrative arrangements easier, is less costly, and possibly to begin with more efficient; but in the long run I am certain that the advantage to the community lies with the part-time service, where it is possible, of the practitioner otherwise engaged in general work. The experience he obtains in one makes him fitter to do the other, and he becomes more efficient in both.

5. *Has any New Thought recently arisen Profoundly Influencing the Outlook upon Health and the Prevention of Disease?*

So far I have been dealing mainly with the environmental aspect of prevention, and environment is pre-eminently a matter for the State and civic authorities, and its improvement is a communal affair; we have hitherto accordingly been considering the social aspect of health and prevention. I am the last to deny its importance, but a new outlook upon health and disease has been forced upon me recently through the writings of F. M. Alexander, and my personal knowledge of his work, which point to health and disease being largely a question for the individual.

There is no time here to go into this new view exhaustively, were this indeed the place for it. But just as there is a place for the general practitioner in the social aspect of the matter, so I believe there is a place for him in this individual one. The fundamental thought in Alexander's work is that health, physical and mental, depends upon a co-ordination of the whole body, and that disease is largely due to a failure in this co-ordination, and that this failure is chiefly due to a continuance on the part of man to rely upon instinctive control of the functions of the human mechanism; that, whereas instinct was a sound guide in the stable or slowly changing environment in which man passed his more primitive life, it is unsound in the unstable and rapidly changing environment of latter-day civilization, and for it must now be substituted a conscious control.

That similar thoughts are influencing others is evidenced by some of Sherrington's work; by H. C. Cameron's paper on the nervous child at one of the Sections last year, when he related the condition of the nervous child to faulty posture; and, again, by a most interesting article by W. A. Cochrane in the British Medical Journal of February 23rd this year, in which he relates most disease similarly to faulty co-ordination. In this article he says, and I think rightly, that "No part of the body can be used wrongly without the body as a whole suffering, and if one group of symptoms, whether referred to the foot, knee, hip, back, shoulder, or abdomen, is to be regarded as local only, treatment is not likely to be satisfactory."

Alexander stresses particularly this need for general as against specific treatment, and he claims that education and re-education will prevent disease and will eliminate it when it is established, and, indeed, make man largely superior to environment; and my own observation on his work induces me to believe that he largely justifies his claim.

If this is so, then there is pre-eminently a place for the general practitioner, whose function it is to deal with general medicine, first in research into the truth of the claim, and, secondly, in the application of the principles of the truth if it is established.

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General practitioners, as a body, have not hitherto taken much interest in prevention, the reasons for their indifference being: (1) The very unattractive way in which the subject of preventive medicine was presented to most of us as medical students, and our consequent thought of it as concerned only with such unsavoury matters as drains and smells; (2) dissociation of the idea of prevention from all other subjects in the curriculum, which only recognized established disease or death; (3) our resultant conception of a medical officer of health as not really a proper doctor at all, but as someone akin to a more or less genteel plumber or scavenger, who varied the monotony of his mechanical calling with occasional body-snatching among the private practitioners' patients.

There has been a steady evolution of the preventive idea during the last fifty years. First there was the urgently necessary "epoch of sanitation," which saw an intense campaign of cleaning up, and preaching of the gospel of cleanliness. This was the essential foundation for subsequent effort. Next came the "germ epoch," in which was effected the subjugation of epidemic disease. During this time the bacteriologist came into great prominence, and it was believed that "preventive medicine is bacteriology writ large." There followed upon this the present "epoch of social study in relation to disease," with its much wider outlook, continuing the policy of the previous eras, and adding to this a continuous consideration of the individual, throughout life, with a view to the maintenance of sound health. This requires an intimate knowledge of the influence of environment, habits, occupation, mentality, and heredity upon the bodily functions, together with ability to recognize the earliest divergences from the normal.

Sir George Newman, in his review of medical training, rendered signal service in demonstrating to those responsible how lacking was the general knowledge of natural processes, and how necessary, therefore, a much greater emphasis upon the study of physiology, since the occurrence of pathological conditions was, after all, due to physiological breakdown. He emphasized strongly the imperative need for carrying the idea of prevention, and preventive application, into the teaching of every subject, advice to which the training schools are now giving close consideration.

The general practitioner undoubtedly constitutes the first line in defence—a line with a great deal of reserve power that has never been put to use. The family doctor is in a unique position for detecting and observing tendencies to depart from the normal, and he knows, best of anyone, the family circumstances, habits, and environment, and their influence upon the health of the members. The need, then, for the closest possible co-operation between him and the health department is obvious. For an example, neither the general practitioner nor the medical officer of health can prevent poverty, probably the chief cause of ill health, and certainly of its continuance. But much may be done to mitigate its asperities and consequences by the fullest possible use of existing facilities, many of them provided through the health department. Even if the general practitioner is not fully conversant with all such agencies in his neighbourhood, he can always obtain information about them from the medical officer of health, if the latter is worth his salt.

Much of our serious invalidity develops from neglected trifles, beginnings of a pathological sequence, such as "growing pains" in children, carious teeth, minor forms of indigestion, eyestrain, enlarged tonsils and adenoids, chronic ear discharge, personal uncleanliness, pediculosis or scabies, and the hundred-and-one little troubles that upset babies (and their mothers), but which we have never been taught to recognize or consider. All these may be the beginning of a lasting misery. The starting factor of disease may not always be within the human body. Thus, to take an imaginary case, and trace backward. Cancer of the stomach may arise from the train: gastric ulcer, chlorosis, constipation. And this may result from avoidance of daily evacuation owing to the public position or nastiness of the domestic privy.

A problem that is seriously prejudicing success in the fight against consumption is the difficulty in getting hold of cases in the early and curable stage. The great majority of sufferers do not consult a doctor at all until the disease is well established, and there is quite an appreciable proportion in which the condition is suspected, yet valuable time is lost before obtaining expert opinion, either through hesitancy on the part of the doctor, or even a mistaken sense of consideration for the feelings of the patient or his friends. Occasionally one still comes across deaths of patients who have never been notified, so that no step has been possible for the protection of other members of the household. Comment on such culpable laxity is superfluous. But the private practitioner could make considerably more of his opportunities for the detection of early signs of, or tendencies to, tuberculosis among the others of a consumptive's family, and so anticipate the intervention of the medical officer of the municipality.

Much more might be done by the profession as a whole in education of the public in matters relating to health, such as the value of a clean and tubercle-free milk (which will certainly not be forthcoming until people learn to demand it); the significance of insanitary domestic conditions and habits in relation to summer diarrhoea; the vital importance of breast-feeding, the discontinuance of which on the flimsiest evidence of insufficiency or inadequacy is too often condoned by the family doctor. The private practitioner is in a specially favourable position to gather valuable data bearing upon the causation and conditions conducive to the occurrence of diseases, such as encephalitis lethargica and cancer, that are of growing concern to the nation at the present time—data the significance of which is only perceptible to the man with an open mind, who can observe more than the mere lesion for which his services were originally requisitioned. So, too, in other questions of public health policy, such as atmospheric pollution, food adulteration, water supply, scavenging, public parks and recreations, his help would be of the greatest value, not necessarily through membership of his local council, but through his local British Medical Association Division. He, better than anyone else, can help in the control of venereal disease by direct advice to young people, and by teaching parents how to protect and warn their adolescents.

Lack of enthusiasm on the part of the general practitioner has led to the multiplication of the minor—but far from unimportant—whole-time clinical appointments by municipal authorities throughout the country. So often when part-time medical officers have been tried the venture has failed through want of sympathy, inattention, or unpunctuality (not always unavoidable), or actual temperamental unsuitability of the person selected, and the local authority has been compelled to install whole-timers instead. This is very regrettable, for while the immediate gain to the authority, both in practical results and financially, is seemingly considerable, such a specialist post proves in most cases a mere cul-de-sac, offering no prospect of professional or material advancement to the holder, and if not soon relinquished it results only too often in a narrow and cramped outlook, with blighting disappointment.

It would be of immense advantage to the community as a whole if the invaluable experience obtainable only in the various clinical undertakings of public health authorities could be garnered by private practitioners, who would then be able to utilize it for the good of all.

C. E. S. FLEMMING, M.R.C.S., L.R.C.P.,
Member of the Consultative Council, Ministry of Health.

To put into practice the doctrine of the unity of the medical services requires something more than lip service; the object of this discussion is, I take it, to indicate what that something is. Before doing so we must have some idea of what we mean by the term "preventive medicine"; it originally implied the treatment of the environment of the people, it later included the treatment of certain patients who, on account of their condition, were dangerous to other members of the community, and to-day it is concerned with the treatment of patients to prevent the development of disease in themselves. This last is what in fact the general practitioner does, quite as effectively when he has the chance, though not with the same method, and with a different apparent objective from that of the medical officer of health.

The public authority has undertaken it because it has not been done efficiently or sufficiently before. Why was this so? Dr. Macdonald has pointed out the economic reason, but, further, we must remember that the patients or their parents did not appreciate the need, and medical men in general have been by force of circumstances and training too much obsessed with curing established disease. There has been, there still is, a greater difficulty for the general practitioner—practical, one might say ethical: the impossibility of his seeking out and following up these potential patients. There is also the fact that he has had no

sort of authority to compel their attendance, and, even if he had, he would not always have been able to provide all the necessary treatment or to ensure that it was carried out.

Some of these difficulties could be overcome without legislation, but not all. The disputed territory lies in the various clinics; no commission can settle the boundary line, it can only be arranged by the mutual agreement of both parties, who no doubt realize that they are, after all, only different units of the same service. The question is not who should actually do the work at the clinic, but: Is the clinic, as it exists, always a necessary part of the practice of preventive medicine; could the work be equally well done otherwise?

At present the patients are by various means got to the clinic, often at much inconvenience to themselves and at considerable cost. This in addition to the cost of equipment, general staffing, and management, and the fixed place and time make it frequently impossible for the family doctor to undertake the work there. If, instead of being referred to a clinic, the patients were definitely sent to such medical men as agreed to do the work, and were attended by them at the patients' homes or the doctors' surgeries, the attendance being paid for by the authority in control of the clinic, the cost would probably be less, and the advantage would be great. The service would be more convenient to the patient because of better possibility of adapting both time and place. It could not fail to be a great advantage, from the point of view both of cure and prevention, if the patient could be seen in his home surroundings. Moreover, in a large proportion of cases the medical man would be acquainted with the family medical history.

In addition to this, the general practitioner's wide experience of the history and reaction to treatment of all sorts of disease in all sorts of conditions must be set against the more limited clinical experience of the assistant medical officer, who too frequently is changed as soon as he has gained valuable experience, and who, if he is not changed, runs the risk of having been too long engaged in too limited a sphere of work. These clinics deal essentially with disease in its earliest stages, but the earlier the stage of the disease the more difficult it is to diagnose and appreciate and the more important it is to have the help of the experienced general practitioner.

In large industrial centres clinics may be a necessity, but in small towns and country districts I cannot see the advantage gained by transferring this work from the experienced general practitioner, provided that he is given proper facilities, to the assistant medical officer just referred to, to be done at the clinic, which is to many becoming a fetish. It is assumed that arrangements would be made for consultations and specialist treatment when necessary. This applies to all sorts of clinics, except those, such as dental, eye, and orthopaedic, which are particularly specialized. To none surely does it apply with more force than to the antenatal clinics which it is now proposed to set up all over the country. The local medical men might take some part in even the special clinics if these were conducted in connexion with cottage hospitals.

It has been objected that the State would not be willing to pay for this work unless it had some opportunity of inspecting it, or some guarantee of its efficiency; but it already does pay for midwifery work, which it has no opportunity of inspecting. How, in actual fact, does the local authority inspect or ensure the efficiency of the clinical work of its own medical officers?

Though the medical officer of health has become clinician as well as administrator, I have no desire to see the family doctor become administrator as well as clinician; but there is other work that might with advantage be allotted to him: I have in view the notifying of houses that are unfit. To give him power to do this might require legislation; it certainly would if it were to be made a duty, and I can see no objection to this under certain conditions. It is already his duty to notify certain cases of infectious disease, so that they may be dealt with in such a way as to prevent spread; why should it not likewise be his duty to report on such conditions of living as are favourable to the growth and spread of infectious and other diseases? I would give him the power and the duty to report, not to take action.

An excellent instance of the manner in which the practitioner may take part in preventive medicine is that suggested in the recently issued report of the Departmental Committee on the Medical Examination of Young Persons for Factory Employment. This shows how a little assistance, in the way of information given by a department to the practitioner, may enable him to do very valuable work. His wide knowledge of disease, his frequent contact with the worker, his acquaintance with his home surroundings, combined with the knowledge of the past history which he will get from the education authority, will enable him to give very valuable opinions.

Many of the difficulties in the way of the general practitioner taking a larger part in preventive medicine could be overcome by legislation. In theory the medical man should be paid to keep his patients well, but he cannot be expected to undertake to do this unless he is at the same time given power to control their habits, their method of living, and their surroundings. This, of course, would not be practicable. The nearest organization by which we could overcome the difficulties would be an extended national health insurance service. The advantages in this respect are so obvious that I need not detail them.

It might be objected that under this service some medical man actuated by a subconscious self-interest would let the medical officer do as much clinical work as possible; *per contra*, the medical officer would reason—the panel practitioners are paid to do this, why should I do it? Incidentally he would admit the general practitioner's fitness and ability to do it. Fortunately, however, the profession is not impelled by motives of self-interest, but by that inbred, or at any rate inculcated, altruism which is now generally called by the less pleasing name, herd instinct. Under this service medical men are already carrying out a very valuable work in the making of records, which, with care in collation and interpretation, should be of great value to preventive medicine.

The general practitioner has now not only an opportunity but a duty to help in the work of the public medical services, and he, on his part, will recognize the need to adapt to it both his practice and himself; he will attain a better appreciation of and education in the science and practice of preventive medicine; that he has not had it in the past is not his fault, but the fault of those who were responsible for his training. This omission is now being rectified, but the reform will be of no avail if more use is not made of his newly acquired knowledge. We cannot overlook the fact that, so far as clinical medicine is concerned, the general practitioner has much the same education as the medical officer of health, and after some years' practice has perforce more clinical experience than the latter. All he wants is the opportunity and the authority to use it.

All medical practitioners are in fact potential servants of the State, and if their service can be given without undue interference with their freedom and individuality, so much the better for the State and for medicine. Whether their special work is administration, clinical medicine, or laboratory research, there is every reason why they should work together as members of one service, for the family doctor's experience, his knowledge, and his opportunities are essential for the completion of the practice of preventive medicine.

GENERAL DISCUSSION.

Dr. F. E. Fremantle, M.P., remarked that, strictly speaking, the economic contract of the general practitioner bound him to attempt the cure, not the prevention, of disease; similarly, the economic contract of the medical officer of health was not to prevent but to advise his local authority how to carry out its statutory duties. But indirectly the "contract" covered the current conception of the "doctor" as the friend of humanity who would do his best whether he was in private practice or public office. The profession was trained to work for the higher and larger object, and not for the narrow lay conception of an economic contract. This basis was difficult to maintain in these days of materialistic trade unionism, but it was vital to maintain it for the sake of their profession, their

successors, and their own peace of soul. Though the general practitioner deserved credit for many of the achievements attributed to public health, he could do much more by taking a more active part in public life—for example, in local elections and on local authorities. He should make the influence of medical opinion and experience more directly felt through the medical members of Parliament, who largely failed owing to inadequate support by the profession. This was the fault of no one in particular, but it arose rather from the lack of efficient machinery. If individuals could each make themselves responsible for one of the several subjects—for example, milk supply, midwifery, tuberculosis, and so on—a body of evidence could be elicited by questions in the House, publicity and world-wide support be secured, and action taken on businesslike and strategic lines, thus making full use of the representatives of the medical profession in Parliament.

Dr. J. S. MANSON (Warrington) thought that the general practitioner was quite alive to his responsibilities in respect to the preventive side of medicine. This was evidenced by the way in which he carried out his statutory duties in the form of notifications and suchlike. He was always ready to give advice on matters of general health, but he was willing to admit that such advice would be much more effective if it were backed up by his own personal example.

Professor F. E. WYNNE (Sheffield) agreed that some of the prejudice which lingered in the minds of the profession was due to faulty teaching of the subject of public health to the students in the past. He considered it the duty of all those who were engaged in the teaching of this subject in the universities to lift it to a higher plane, and to show that the intensive study of preventive medicine formed a link between the elaborate training of the student and its application to practical life. Personally, he owed a great debt to the cordial co-operation of the general practitioners in Sheffield, where the whole of the clinical work was carried out by part-time officers. A practical difficulty, however, arose in referring patients to the general practitioner in that he was not in a sufficiently independent position to assist in educating his client to avoid the traditional bottle of medicine, which, especially in the case of infants, was generally useless and often injurious.

Dr. H. B. BRACKENBURY (London) maintained that the general practitioner had many opportunities of taking part in the work of preventive medicine, and was at the present time availing himself of them. He had a greater chance than anyone of seeing and tracking disease in its early stages, and, almost alone in the profession, he directed his mind to the whole organism, or even to the whole personality. In addition, the general practitioner was now carrying out a large amount of active prophylactic work by means of vaccine therapy and similar methods, and he was also increasingly consulted on matters of personal and even factory hygiene. In all this work it was quite usual to call it "preventive" when done under the auspices of a public body, but not to recognize it as such when done by a general practitioner. He had also great opportunities in the way of propaganda both amongst the public and members of administrative bodies, especially if he put himself forward for election on the latter. In this he should not be deterred by the fear of self-advertisement. If economic conditions would allow, his work should be so arranged that, instead of spreading his time and energy over a large number of persons, he could concentrate on a smaller number, thus dealing with them more thoroughly from the aspect of prevention. This would be a powerful aid in securing more and better work being done in this direction.

Dr. JAMES R. KAYE (Wakefield) expressed his appreciation of the part played by both branches of the profession in relation to public health. As an illustration he quoted the example of the West Riding County Council, which had now forty general practitioners doing county work, in addition to thirty-eight whole-time assistants. In reference to propaganda work, last year they had obtained the voluntary co-operation of 160 medical men in giving some 280 lectures in the elementary schools during "Health Week," and they hoped to increase those figures this year. The universality of the subject covered numerous fields of civil activity, and embraced very closely the efforts of the general practitioners. The significance of the title "Doctor" should not be overlooked, and it should be recognized that the wider education of the healthy is fraught with more advantages than the bedside nursing of the sick. As to any new thought influencing the medical outlook, in his opinion it was supplied in the modern idea of promotion of health as distinct from prevention of disease. He agreed with Oliver Wendell Holmes's remark that it would be a good thing if the whole of the drugs in the *Pharmacopoeia* were thrown overboard, and that "a healthy cobbler was a better man than a sick king."

Dr. D. MCKAIL (Glasgow) was very pleased to hear about the great use that Dr. Kaye was making of the general practitioners in the West Riding of Yorkshire, and of his high appreciation of their work. He regretted that in former days so many recently qualified practitioners had been appointed as school and tuberculosis officers. He believed that experience in general practice was a very valuable preliminary to all such work, if not a necessity in urban districts. Parents and others would pay more attention to the views of matured men. Such posts also afforded a means of part-time employment for medical men wishing to ease off from the stress and strain of general medical practice.

Dr. LOCKHART STEPHENS (Emsworth) recommended the employment by local authorities of general practitioners in educational work, for which they could be trained by post-graduate lectures. The demand of the public for information concerning health matters was gradually increasing, and by such means that valuable asset of the trust which a patient had in his doctor could be utilized in a way which had hitherto been neglected in preventive medicine. The day of dosing infants for diarrhoea was over, and it was time the public were taught so.

Dr. H. SCURFIELD (late Medical Officer of Health, Sheffield) asked what was to be the attitude of the general practitioner towards the midwifery of the future. Emergency midwifery was condemned, and preventive midwifery was taking its place. Preventive midwifery required greater skill and knowledge. Most of the births nowadays were attended by midwives. If the general practitioners attended fewer cases their ability to help the midwives would obviously grow less. Was the future midwifery service to be a panel of obstetricians (perhaps largely women) doing the ante-natal work, attending births, answering calls of midwives, giving the newly born a good start in life, and working in co-operation, not in competition, with the general practitioner?

Sir MALCOLM WATSON, M.D. (Federated Malay States), expressed surprise to hear the plea for unity between the two branches of the medical profession. Was it that there had been too much specialization, and hence a drifting apart? In his long experience abroad he had seen that the waste places of the earth had been made habitable only by pioneer work and co-operation. Employers could be made to realize that the health of the worker was essential for commercial success, and it seemed that this needed to be impressed here. In this country the practitioners must educate the public; without this there could be no progress.

Dr. CECIL WILLIAMS (Medical Officer of Health, Todmorden) asked for a better definition of the duties the general practitioner owed to preventive medicine, particularly in ante-natal work and in tuberculosis. Inadequate action by a local authority caused the general practitioner to depreciate notification.

Dr. N. R. RAWSON (Whitley Bay) reversed the familiar order of expression and claimed co-operation of the medical officer of health with the general practitioner. Much misunderstanding had arisen through the former failing to consult with practitioners in matters relating to the school

medical service, ante-natal work, and tuberculosis. The general practitioner should not be ignored in public health schemes.

Dr. R. WOOLSEY STOCKS (Medical Officer of Health, West Bromwich) emphasized the necessity of observing the old custom of a newcomer calling on the other practitioners, and said this should be observed by health department assistants. Personal acquaintance would go far to remove misunderstanding. He also advocated the discussion of public health subjects at meetings of the British Medical Association Divisions.

Resolution.

Before the meeting adjourned the following resolution was moved by the PRESIDENT and seconded by Dr. H. C. PATTIN (Norwich):

> That the Council be requested to institute an inquiry as to the best means of applying the experience and influence of the medical profession to the work of Parliament, especially with a view to the establishment of an effective co-operation with the medical members of Parliament.

On being put to the vote of the meeting this was carried unanimously.

The Popular Lecture

ON

THE SUN CURE.

DELIVERED AT THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION, JULY 25TH, 1924,

BY

SIR HENRY J. GAUVAIN, M.A., M.D., M.CH.,

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As in all things human, so in medicine, there are fashions and fancies. Sun treatment recently has attracted a great deal of attention, both medical and lay. Medical men may safely be left to explore its possibilities and indicate its limitations. It is thought by many to be a new method of treatment; actually it was employed by the ancient Greeks, and perhaps long antedates that period of history. Physicians have for ages recognized the value of sunny climates, and have recommended sunny districts to their patients; particularly have they noted the value of sunshine during convalescence from illness. Nations have even been sun worshippers, and to this day the people of Hammerfest celebrate the return of the sun to that Arctic city with festival and rejoicing. It is strange, then, that the scientific study of light used intensively should have been so long delayed.

While it is true that sunshine has been long employed therapeutically, its scientific utilization for the relief of disease is of quite recent date. The work of Finsen opened a new epoch in scientific light treatment. The genius and the value of his researches are now universally recognized. It is worthily succeeded by Dr. Axel Reyn, who addressed this Association last year. Bernhard at the commencement of this century and Rollier in 1903 were pioneers in the sun cure.[4] I recall Dr. Stoker, shortly after the Treloar Hospital was opened, describing to me the methods of the natives during the Zulu war, who took their wounded braves to the mountains and exposed them naked to the sun with results that were remarkable. He ascribed the success of this measure to the purity of the air and the presence of ozone; while that was undoubtedly of value, the actual rays of the sun were probably the principal factor in the success of their treatment.

Very shortly after we commenced work at Alton, I, with youthful enthusiasm but without actual experience, commenced careful sun exposures with happy results that surprised me. The summer of 1911 first convinced me from clinical findings of the true value of insolation, and the treatment has since been systematically applied at Alton in every suitable case with encouraging results. Nevertheless, the effects of this, as of all methods of treatment, should be considered calmly and judiciously. In a paper in 1914 I stated:

> "The value of heliotherapy should not be unduly exaggerated. . . . A prolonged trial of heliotherapy at Alton has convinced me of its value. . . . Heliotherapy is an adjuvant to treatment and as an aid to treatment is of the greatest value; but the indications for its employment and its limitations should be very clearly recognized."[1]

In 1920 I wrote:

> "The sun cure should be regarded as an adjuvant, and merely as an adjuvant, method of treatment in non-pulmonary tuberculosis. The extravagant claims made by some advocates of this method of treatment need to be examined with critical care. In certain instances they have been advanced on questionable grounds, either by enthusiasts biased in their opinions, or for reasons which happily are not regarded with favour in English medical circles. Such statements as 'The sun will cure all forms of surgical tuberculosis' are contrary to fact, and will sooner or later bring disrepute and disillusion on a method of treatment possessed of many advantages, a method of which the application is very desirable in certain cases, but with definite limitations. . . . Examination of the methods employed by the most successful exponents of the sun cure shows that much of the success attributable to insolation is due rather to conservative measures (in *surgical tuberculosis*) skilfully applied, aided by the discriminating employment of heliotherapy."[2]

These words are equally true to-day, though since they were written many researches of the greatest interest and importance have been completed, and establish ever more firmly the value of this method of treatment; they equally demonstrate that its employment in disease should be entrusted to skilled and competent practitioners and should be used in the light of existing knowledge with judgement and discrimination.

Comparatively little general interest in sun treatment was evoked until 1921, when the most wonderful summer in living memory, coupled with the increasing advocacy of an extended summer time, compelled universal notice in England of the effects of abundant sunshine, and directed an almost embarrassing attention to our work at Alton. Quite suddenly this method of treatment attracted widespread notice, and nobody was more surprised than we at the interest aroused in our work, which had been carried on for years in comparative obscurity.

I must be brief in dealing with a subject which has so grown in interest that already there has arisen a considerable literature. Perhaps, in the limited time, I can be most helpful by indicating rather the dangers of the treatment than its advantages (for every potent treatment must in unskilled hands possess dangers), and the way in which, as far as present knowledge extends, sunlight acts.

DANGERS OF HELIOTHERAPY.

The dangers may most simply be classified under two headings: (1) due to carelessness or ignorance; (2) due to unsuitability of the individual.

(1) The most obvious dangers under this head are sunstroke, heat-stroke, and sunburn. The former is produced by local heating of the brain as well as by general heating of the body, while heat-stroke is caused wholly by the latter. Professor Leonard Hill and Dr. Argyll Campbell have shown that by placing the head end of a rabbit in the sun and the tail end in the shade the temperature of the brain may rise several degrees above that in the rectum. The circulation of blood is not sufficient to distribute the radiant heat locally received equally round the body. If the brain temperature rises too high death may result. Hence the need of suitably protecting the head and the spinal column, particularly in the tropics. Heat-stroke is preceded by fatigue of the sweating mechanism on which the heat regulation of the body depends in hot atmospheres. Such fatigue and failure to sweat is accelerated by illness. Heat-stroke can be warded off by induction of artificial sweating, by wetting the patient with a spray and blowing upon him with a fan. Heat-stroke is especially prone to arise in windless hot atmospheres, and in overheated conditions.[3] Sun-burning may contribute to the onset of sunstroke or heat-stroke by making the subject ill through absorption of the product of damaged tissues. The blister which results in extreme cases of sunburn may leave an open sore which in turn may become infected and is thus a source of danger. Sunburn should always be avoided. I hold a nurse who allows her patient to develop a sore in

consequence of sunburn in equal disgrace with a nurse who permits a sore to form on a paralysed limb through lack of care. By carefully graduated exposure such sores may be avoided; they do not occur when the skin has gradually become well pigmented and chocolate-coloured. In some patients with limited pigmenting power they may be difficult to avoid unless extreme care and skill are exercised.

(2) Dangers due to unsuitability of the individual exposed are more difficult to describe, and in certain cases can only be ascertained by undertaking complicated tests. Subjects who will not pigment, or who freckle but do not pigment well, should only be exposed under medical advice and with meticulous care. Albinos are unsuitable for sun treatment. In them the protective pigment so useful in undertaking the sun cure will not form. Briefly and for general guidance it may be said that the very young, the aged and infirm, people suffering from any illness or organic disease, should never attempt sun treatment except under medical advice. For many of these sun treatment may be of the highest value, but there are dangers in its application, so great, that treatment should only be undertaken by those expert and trained in its use.

Precautions to be Taken.

For the robust who pigment well and are free from organic disease, carefully graduated exposure to the sun has little danger and may be very advantageous, but certain precautions should always be taken. The feet should be first exposed; gradually more and more of the body should receive insolation; and only after about a fortnight (though there may be individual variations) should full exposure be permitted. Eventually a total exposure of some two to three hours a day may be permitted with advantage, but always the head should be protected; the patient should never be too hot or too cold, blistering should be avoided, and exposure should stop short of fatigue, but should be followed by a feeling of well-being and exhilaration.

Naturally the interpretation of directions for the conduct of sun treatment in this country needs common sense: conditions suitable for sun treatment vary so much, according to season or locality. Thus I left Alton at 9 o'clock yesterday morning in a blaze of sunshine and a blue sky, with my little brown patients exposed nude to the sun and air. I arrived at Bradford at 3 o'clock in the afternoon in a cold drizzle with a dark and lowering sky, conditions quite unsuitable for a sun-bath. Common sense must therefore be employed, but a good safe rule to be observed is that individuals exposed should not feel cold nor should they be unduly hot.

Patients responding suitably to insolation are extraordinarily immune to colds and catarrh, not only when receiving treatment, but their resistance is so raised that this immunity usually remains for a considerable time after treatment is completed. Coughs and colds are almost if not quite unknown amongst my patients at Alton and Hayling Island.

I observed just now that in cases of organic disease, sun treatment, though often highly beneficial, should not be applied except under medical advice and direction. It is not necessary in this lecture to review the indications or contraindications, nor describe the tests which should be made. This matter is too technical for discussion here.

I must, however, make passing mention of sensitization in sun treatment, a phenomenon of extraordinary interest which is receiving attention now. Certain fluorescent substances, as eosin, sensitize animals to the visible rays. Hypersensitivity to light sometimes occurs in families. A substance known as haematoporphyrin, an iron-free derivative of haemoglobin, is a most remarkable sensitizer, and a small quantity of this injected into white guinea-pigs will make them so sensitive that they will die on exposure to light. Hill has shown that if painted on the abdominal wall, which is then exposed to light, not only will the belly wall of the exposed animal slough and die, but subjacent viscera in contact with this part of the body will also undergo necrosis.

In other words, then, when undertaken not under medical advice, insolation is suitable for the well man only who feels the better for it. For the sick and infirm it should never in any circumstances be undertaken except under medical supervision. I have purposely stressed these dangers and advised caution because dangers do exist and I feel a responsibility in the matter. Under skilled medical advice and supervision they need not be apprehended, and many a sick and convalescent patient might be aided could he but have the opportunity of a properly planned sun cure.

How the Sunlight Acts.

Properly planned sun treatment may be said to be beneficial in three ways:

1. *Psychological Action.*—Sunlight has a powerful stimulating and tonic effect. It exhilarates and enlivens. Those who live in the sun are notoriously merry and lively. It braces up and cheers the soul, and tends to banish depression. Not only is the vivacity of the patient increased but his mental capacity is raised. As a well known writer has said: "The sun is a dispeller of ill-humours." But, like all stimulants, if pressed to excess it intoxicates and then exhausts.

2. *Local or Direct Action.*—Sunlight has a powerful direct bactericidal action. It has been described as the world's greatest antiseptic. This property is especially strongly possessed by the ultra-violet rays in the sunlight. These rays have very little penetrative power, so that the direct bactericidal action is limited to organisms on the surface. Nevertheless, on superficial wounds it is of value both by its direct bactericidal action and also by the favourable inflammatory response which carefully graduated exposure elicits. Penetrability may be assisted by mechanical means such as utilized in the Finsen lamp, and in that way such diseases as lupus may be cured. Nevertheless, the penetrability of ultra-violet rays is so limited that Barnard has stated that if a tubercle bacillus could be conceived as directly superimposed on another such organism, the exposed bacillus would be slain, the subjacent one survive.

3. *Indirect or Remote Action.*—The most fascinating problem presented to the heliotherapist is: Why and how can a deep-seated lesion protected by a mass of superjacent tissue which by no conceivable means can be reached directly by ultra-violet radiation be favourably influenced? Before answering that question let me direct attention for one moment to the solar spectrum. A beam of white light is composed of many rays of different colours and different wave-lengths. Below the red rays are the invisible infra-reds radiating heat and demonstrable by their ability to raise the mercury in a thermometer placed in their track. Beyond the violet are other invisible rays, the ultra-violet, rich in actinic power and capable of producing an image on a photographic plate. These rays diminish in wave-length from the infra-red to the ultra-violet. Luckiesh states that if a normal spectrum of the entire range of wave-lengths of radiant energy could be produced, and the spectrum of light—that is, the portion due to visible radiation—were but one foot long, the entire spectrum would extend for several million miles in length.[5] Happily we are here only concerned with a very small portion of that spectrum. Research has indicated properties in some of these rays which are now capable of practical application in the service of man. Very long-waved infra-red rays constitute the so-called wireless used in broadcasting, wireless telegraphy and telephony, but the term "wireless" reserved for this method of conveying messages is a bad one, as all forms of radiant energy may be projected without the aid of conducting wires. Very short-waved rays have been for years used with the greatest benefit in the diagnosis and treatment of disease, as the *x*-ray and radium emanations. These two examples are of very long- or very short-waved rays at the extremes of the scale, but it is those waves in the neighbourhood of the luminous spectrum, the near infra-reds, the visible, and the near ultra-violets, that especially concern us in relation to the sun cure.

All these rays, suitably controlled, shed a beneficent influence on living matter, but only some of their potentialities are as yet known. Without indulging in speculation, we are, however, able already to detect some of the

effects of the infra-red, visible, and ultra-violet rays, and in the present stage of our knowledge the ultra-violet are the most important. It is interesting to note that the effects of particular rays may be modified by substituting or combining other rays. Thus, an *x*-ray burn may be treated advantageously by ultra-violet light, and the lethal effect of ultra-violet light on infusoria may be postponed by admission of visible rays. It is probable that the combination of rays in the solar spectrum is peculiarly suited to the needs of the inhabitants of this planet, particularly in temperate regions.

Certain of the properties of the ultra-violet rays on the body have been ascertained; notably the recent discovery of their ability so to influence the blood, after due exposure of the skin, that its power to destroy disease-producing organisms may be greatly increased. This is a property of the greatest interest and value. It affords an explanation of the beneficial effect of sunlight on septic conditions. Haemobactericidal power after insolation, though commonly raised, may be occasionally lowered, and this is an additional reason why insolation should be applied under medical direction, as in certain conditions lowering of the bactericidal power of the blood may just turn the balance and result in great harm to the patient. For the discovery of this property of ultra-violet light credit must be given to Professor Leonard Hill, working with Dr. Colebrook and Dr. Eidinow. It is, I think, one of the most important discoveries made in recent years, and likely to have profound significance in therapeutics. From clinical considerations one felt that such a result must be produced, but it needed the skill of these investigators to demonstrate it. Here I would especially pay a warm tribute to the brilliant investigations of Professor Hill.

Other remarkable properties of the ultra-violet light are: its effect on the calcium metabolism of the body, assisting in that way in the repair of diseased bony tissues; its function as an essential food sparer. In a vitamin-free diet it enables life to be prolonged and disease due to vitamin deficiency, as rickets, to be cured. It has the power, too, of creating pigment in the skin. This skin pigment has a protective quality, permitting prolonged exposure to sunlight to be safely endured and utilized for the good of the bodily health. These are but examples of some of the properties ultra-violet light has been shown to possess, and this knowledge may now be applied in practical therapeutics.

The visible rays, of longer wave-length than the ultra-violet, have greater penetrative power, pass through the skin, and are absorbed by the blood, their energy being converted into heat. This fact was discovered by Sonne, who put forward the suggestion that this local heating of the blood destroys toxins or poisons produced by germs, and supported his view by a series of experiments with lethal doses of diphtheria and typhoid toxins injected into rabbits.

The infra-red rays have even greater penetrative power, and produce local congestive and thermal effects. It is unnecessary to dilate further on the properties of various rays. I have but indicated a few of the more important effects as yet discovered. What the future will disclose I know not, but much remains to be discovered. Enough has been said to show how complex is the modern science of heliotherapy, how manifold are its possibilities, how strange and unexpected its effects. Their very complexity shows that they should be employed with caution, with a definite aim, and on sound physiological principles. All these rays, be they infra-red, visible, or ultra-violet, induce inflammatory reactions, which, properly controlled in suitable subjects, may be utilized in the fight against disease.

I cannot do more than mention here the incidental effects produced by sunlight. Insolation necessitates exposure of the skin to the cold air. This in itself produces all sorts of effects which would need a special lecture to describe. Especially is this of importance in increasing metabolism—a matter of great moment in treating such a disease as surgical tuberculosis. Still more may the body metabolism be raised and the effects of the sun-bath increased if the latter follows carefully graduated sea-bathing.[6] Ultra-violet radiation is more intense at the seaside than inland; the sea is a great mirror reflecting the actinic rays, absorbing the heat rays, and hence intensifying the action of the former.

Conclusion.

To my mind, study of the so-called sun cure opens up a vista much wider and more extensive than that exhibited by mere consideration of the effects of radiant energy. It means that we have at hand a potent method of producing cell stimuli and of profoundly modifying or altering the properties of the cells of which our bodies are composed. The study of bacteriology, important and valuable as it has been, has perhaps too much obsessed us. Bacteriologists have patiently investigated the seeds producing disease, their cultural and microscopical character, their variations, even the various strains of similar micro-organisms. We can divide tubercle bacilli into human, bovine, avian, atypical, and other strains. But what about the soil into which these organisms are implanted? We do not need to be agriculturists to know that certain seeds will only grow in certain soils and under certain conditions; that if they do grow they may be profoundly modified by altering the nature of the soil or locality or climate. Have we not been rather slow in applying that knowledge to disease in man? Let us study ever more eagerly and intensively the properties of the human soil, how we may modify and alter it until at last it becomes impossible for germ diseases to be implanted and develop. The sun cure is only one indication of how this new study may be developed. Itself it is full of hope and promise, but greater still are the lessons to be learned by considering how the properties of the living cell may be modified. After all, the cell is the fortress against disease which needs to be strengthened and reinforced so that it will not only overcome invasion, but even resist and prevent infection.

One further lesson must still be learned. Sunlight is an important agent in the prevention and arrest of disease. It is a vital necessity for all, especially the growing child. Uninterrupted enjoyment of its health-giving rays should be possible for all, and every effort should be made to reduce the smoke pall which too often shrouds our great cities and obstructs the light. In its intensive use there is great promise in the employment of artificial light for therapeutic purposes. Already at Alton has been initiated a great artificial light department, where light rays of varying wave-length may be used separately or in combination to supplement or take the place of that source of all terrestrial energy, the sun. Little imagination is needed to suggest wide and general application of principles I have laid down. But while advocating the sun cure, I feel it is my duty to utter a warning that it must be wisely and carefully employed. Graduated exposures are essential, and all needful precautions should be taken, or a method of great hope and promise will inevitably fall into disrepute.

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[3] Leonard Hill: *Sunshine and Open Air*. Edward Arnold and Co., 1924.
[4] Rollier: *Heliotherapy*. Oxford Medical Publications, 1923.
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Memoranda:
MEDICAL, SURGICAL, OBSTETRICAL.

DIAPHRAGMATIC HERNIA OF THE STOMACH.

The following case is interesting on account of the rarity of the condition and the possibility that trauma was the cause.

A girl, aged 2 years, fell on to the floor, striking her nose. The next day she seemed well and was playing as usual, but on the following day she began to vomit a clear, watery fluid, and subsequently spent a sleepless night. Twenty-four hours later the vomit became brown in colour, the child could not speak, but would do as she was told; she did not complain of pain, but she was constipated and the vomiting continued. She looked ill, with a peculiar staring appearance, though she had quite a good colour. The vomit was typically "coffee-ground"; she had a very rapid pulse; the temperature was normal, and the tongue clean. Very marked epigastric pulsation was present; the heart was pushed downwards and to the right, the apex beat being just below the tip of the xiphisternum. All the heart sounds were of maximum

intensity to the right of their normal positions, the apical sound being best heard just below the xiphisternum and the basal sounds over and to the right of the sternum respectively. Her abdomen was supple and she showed no signs of pain or tenderness during the examination. I could not elicit any knee-jerks, but her pupillary reflexes were normal, as were those of the upper extremities. She had a large bruise over the bridge of her nose, but there was no history of bleeding from it or from the ears or mouth. She became worse the same evening, and died early the next morning. The necropsy disclosed a diaphragmatic hernia. The stomach was in the left pleural cavity, having passed through a circular opening about half an inch in diameter to the left of the bodies of the vertebrae; it was very dilated and full of "coffee-ground" vomit, but as it was uninjured and not congested I find it difficult to explain the presence of blood in its contents. I might add that I had seen this child previously on two occasions, and I did not find the heart in an abnormal position. The coroner brought in a verdict of death due to shock, and added that he was convinced that the child would still be alive had it not been for the fall. I was unwilling to express an opinion on this point, but, on being pressed, I said it was probable that the fall was a coincidence and not the cause of the stomach passing through an opening which had always been there.

R. A. McCabe, M.R.C.S., L.R.C.P.

Rushden, Northants.

PSEUDO-HERMAPHRODITISM.

Cases of pseudo-hermaphroditism are not so very common, hence my excuse for recording the following.

A child, then aged 4 years, was admitted into a home under my care in 1914, and has been seen by me at intervals ever since. The foster-mother under whose charge the child has been told me recently that the child had always been rather a tomboy at school, and that she had lately noticed that the child did not look quite like other girls; and as she complained of a swelling in the right groin she asked me to examine her.

At a casual glance all that was noticeable was an apparent fold of skin about an inch long between the anterior part of the labia majora; on raising this was seen a small triangular-shaped area covered with mucous membrane resembling the vaginal opening of a little child. On further examination it was at once obvious that the fold of skin was a diminutive and ill formed penis, the urethral orifice being on the under surface near the free extremity.

The swelling complained of in the right groin was obviously the right testicle, and on the left side a similar but more elusive swelling suggested the left. The right testicle since my examination three days previously has come down into the right labia majora. The pubic hairs are only just beginning to grow. On rectal examination there is nothing to be felt suggestive of the uterus, and there is no sign of any breast tissue; the child's voice is becoming rather deep for a girl.

It is obvious, therefore, that this child, who has been brought up from birth as a girl, is in reality a boy, and his outward apparel will have to be changed to conform with the masculine organs which are beginning to assert themselves.

Ipswich. John Gutch, M.D.

THE CURE OF PILES BY THE RE-EDUCATION OF THE ANAL SPHINCTER.

The essential factor in many cases of piles is a loss of tonic contraction of the sphincter ani sufficient to allow the blood in the haemorrhoidal plexus of veins to find its way through the capillaries of the mucous membrane of the anal orifice into the external (subcutaneous) veins of the anus. This statement is easily verified, for in cases of piles it is often noticeable that the tightness of the anal sphincter, when tested by the tip of a finger, is less than it should normally be.

In such cases the tendency to piles can be obviated by the simple expedient of teaching the patient voluntarily to contract the sphincter and levator ani many times in the day, and to hold them contracted for many minutes at a time, whether he be standing, walking, or sitting. A very few days, or weeks, of this oft-repeated and voluntary increase in activity will re-establish a normal habit of tonic activity, and the tendency to piles will no longer exist. The efficacy of this treatment is easily demonstrable in any case where there are external piles of any size. In such a case, after the patient has exercised the muscles for a week or so, it will be found that, as soon as the voluntary effort is made, a haemorrhoid of considerable size can be retracted far enough to be compressed by the action of the anal muscles, quite apart from the additional compression which can be exerted by the action of the glutei muscles. The continuous compression thus exercised during the day, combined with the absence of distension of the haemorrhoid (in consequence of the improved tone of the sphincter), will cause a great diminution in its size, and may ultimately lead to its disappearance.

I do not claim that all piles can be cured in this manner, but only that it is a simple method of treatment which often proves effective in curing this troublesome condition.

T. Stacey Wilson, M.D., F.R.C.P.,
Honorary Consulting Physician,
Birmingham General Hospital.

Reviews.

SUNSHINE AND OPEN AIR.

Sunshine and Open Air,[1] by Dr. Leonard Hill, does not disappoint the expectations raised by the author's name. The book is devoted to a scientific consideration and analysis of the atmosphere and sunlight, their physiological effects and their therapeutic significance. Although a very short work, it is closely packed with scientific data; its brevity being due to the absence of redundant matter and repetition. In point of fact, readability is often sacrificed to compression, but the book will well repay the close attention it demands.

The introductory chapter concerns the Alpine winter climate and contains a useful note on the suitability of cases for Alpine treatment; it is pointed out that the measure of success depends upon the power of response of the body to the stimulating conditions. Following this is a chapter on the composition and physiological effect of high and low atmospheres. In the next section, on humidity and catarrh, the author's views may be summed up in his own words:

"The more people pollute the atmosphere with smoke and consequent fogs, cut themselves off from sunlight, shut themselves up to avoid cold, and live sedentary 'hot-house' lives, disordering their economy by over-eating and at the same time reducing the combustion of food through body heat stagnation, the more they will suffer and die from catarrhal complaints."

Most practitioners will agree with Dr. Hill when he maintains that much could be done by slaying the bogy of "catching cold" and encouraging free ventilation, which prevents hot heads and cold feet; and there is undoubtedly, as we believe, an increasing appreciation of the importance of ventilation amongst the people as a whole. In this connexion it is of interest to note that Sir Henry Gauvain, in his lecture printed at page 234 this week, states that patients responding suitably to insolation at Alton and Hayling Island are extraordinarily immune to coughs and colds.

Sunshine is considered in all its aspects. An interesting comparison is made between the lethal power on infusoria, in shallow quartz cells, of sunlight and of the mercury-vapour lamp, the effectiveness being nearly equal. The biological action of light is separately and very fully considered in the fourth chapter. It is impossible to summarize this, but reference may be made to the section on deficiency diet, rickets, and light, in which it is maintained that the ultra-violet rays can ward off or delay the evil effects of a deficient diet. Young rats and children are protected from rickety changes in the bones by a short daily exposure to the sun, the arc or the mercury-vapour lamp.

The closing chapter treats of metabolism, heat loss, and the cooling power of the air, the baneful effects of too sedentary a life, the sense of well-being created by correct habits and environment, and many another consideration of great practical value. The book teems with facts, and their practical application to human needs is not neglected; the result is a book which should be read by everyone interested in the scientific use of natural remedial measures.

CLINICAL DIAGNOSIS.

Dr. Lewellys F. Barker's *Clinical Diagnosis of Internal Diseases*[1] is dedicated to the late Sir William Osler by his pupil and successor in the professorial chair at the Johns Hopkins Hospital. These three bulky volumes,

[1] *Sunshine and Open Air; their Influence on Health, with Special Reference to the Alpine Climate.* By Leonard Hill, M.B., F.R.S. London: E. Arnold and Co. 1924. (Demy 8vo, pp. vii + 132; 12 figures, 8 plates. 10s. 6d. net.)

[2] *The Clinical Diagnosis of Internal Diseases.* By Lewellys F. Barker, M.D.Tor., LL.D.Queens, McGill. New York and London: D. Appleton and Co. 1923. (Roy. 8vo: Vol. I, pp. xlvii + 978, 10 coloured plates, 290 figures; Vol. II, pp. xlvii+1065, 9 coloured plates, 204 figures; Vol. III, pp. xlvii + 1039, 191 figures. £5 5s.)

containing over 3,000 pages and 700 illustrations, were published as part of a six-volume set known as *Monographic Medicine*, the individual volumes of which were not available for separate purchase; now, however, as the outcome of "requests" from various sources, the decision that "all or none" must be bought has been relaxed. Although the bulk of this work might suggest it, Dr. Barker specially disclaims any suggestion that it should be regarded as a "system," which indeed should be the work of many authorities, each an expert in his own subject. There are no doubt serious difficulties before one man who sets out to produce a condensed and at the same time comprehensive review of clinical diagnosis; but it must be recognized that Dr. Barker has brought to this task an encyclopaedic mind, long experience as a teacher and consultant, and opportunities—probably seldom surpassed—of observing and practising the modern methods of investigating the disorders of function. His aim has been to provide a guide to those anxious for directions how to carry out an examination of the human body, both clinically and by laboratory methods. With this in view the tests described have been critically selected, and no attempt has been made to give a recital of all the known methods of research, though the bibliographies appended at short intervals in the text supply references for this purpose. Special attention is directed to functional pathology to keep pace with what in the preface is described as the "seething activity in our clinics in the application of biochemical and biophysical methods to diagnosis."

The style of the text is commendably concise, and this brevity is rendered possible by the generous use of explanatory illustrations, charts, and tables. The book was begun before the outbreak of war, and it must be conceded that delays in printing and publication may have aggravated the ever-present difficulty in keeping a work on such an actively progressing subject up to date; but even so, full of knowledge as it is, it appears to have received little in the way of addition for some years. Thus in volumes I and II the references stop about 1915, and yellow fever is ascribed to Reed, Carroll, and Agramonte's virus without any reference to Noguchi's *Leptospira icteroides*, the last reference on this subject being dated 1914. Weil's disease, or epidemic catarrhal jaundice, is said to be caused by *Bacillus proteus vulgaris*, no mention being made of *Spirochaeta icterohaemorrhagiae;* and the outline of subacute infective endocarditis does not contain any remark on clubbing of the fingers or reference to any article published later than 1914. In volume III, which deals with the muscles, bones, joints, nervous system, metabolism, and endocrinopathics, there is still evidence of a hiatus between the present time and that represented in the text and references. But after all, the most recent fruit is not always the best digested, and, though it is only right to point out omissions such as those mentioned above, these volumes will be widely useful as sources of reference.

Yet another book has appeared on *The Examination of Patients*[3]—this time by Dr. Nellis Foster, Associate Professor of Medicine at Cornell University College of Medicine, New York. The author's hope is that it will prove helpful to practitioners, and this hope will probably be fully justified. The usual fault with books of this kind is that they are too elementary, and better suited for medical students than for qualified practitioners. This volume has escaped this fault, and has not fallen into the ruck of the ordinary textbook of medicine. It concerns itself primarily with diagnosis, as the all-important first step towards treatment, and the author lays stress upon diagnosis being an art as well as a science—an art so far as concerns the eliciting and collating of the signs, both subjective and objective, of disease, and a science in so far as concerns the method of interpreting and utilizing the signs observed. Dr. Foster's aim has been to present such diagnostic facts as appear to receive too little attention in the ordinary textbooks, and to give their chemical or physical explanations, whenever they may be helpful in suggesting a correct interpretation. A special merit of the book is that such diagnostic points are obviously the fruit of the accumulated experience of an observant clinician and teacher, who has been able to sift essentials from non-essentials, and has thus kept his book within a moderate compass.

Following introductory chapters on diagnosis in general, there are chapters dealing with the modes of examination of each of the special systems. All these sections contain practical hints of much interest and instruction to practitioners, particularly when conducting cardio-vascular and neurological examinations. In the latter the portions dealing with ocular, motor, and sensory defects may be especially mentioned.

The book is well illustrated throughout whenever illustrations can be of service. It closes with a chapter on immunological tests, and here, too, the illustrations of the various degrees of superficial reactions are distinctly helpful.

[3] *The Examination of Patients.* By Nellis B. Foster, M.D. Philadelphia and London: W. B. Saunders Co. 1923. (Med. 8vo, pp. xvi + 253; 67 figures. 18s. net.)

TUBERCLE OF BONES AND JOINTS.

Professor Oehlecker's book on tuberculosis of the bones and joints[4] is of the nature of an atlas. He seems to have had at his disposal at the Hamburg hospital a great wealth of material, and from this he not only illustrates cases of bone and joint tuberculosis in almost every part of the skeleton, but for purposes of differential diagnosis has reproduced drawings and photographs of bone lesions caused by other agents than *Bacillus tuberculosis*.

He discusses at some length the sun and air treatment of surgical tuberculosis, and, while paying high tribute to the work of Rollier and Bernhard, maintains that not the least of their services to surgery has been the establishment of the importance of the general treatment of the whole individual as well as of his local lesion or lesions. This treatment, including fresh air and exposure, can be, and has been, successfully carried out at low altitudes, as has been shown in the successful sea-level hospitals in France, and even in "foggy" England equally good results have followed open-air treatment. Disquieting accounts have been received as to the nursing and domestic arrangements in some foreign mountain clinics which dispose us to think that they do not reach the standard to which English parents would wish their children to be submitted. It is fortunate, therefore, that experience is accumulating which goes to show that the results of open-air treatment at lower levels and in higher latitudes may be as good as those obtainable in the Alps.

Professor Oehlecker devotes considerable space to a consideration of the various radiations which have been used as substitutes for the sun's rays, especially various forms of mercury vapour lamp. He deprecates extensive operations and has arrived at the same conclusion as is generally held by orthopaedic surgeons in this country—namely, that the best results are obtained from conservative treatment. Not much space is given to details of treatment of particular local lesions, and it is more for its illustrations of bone disease than for any practical hints that we can recommend it to those who are interested in the subject.

[4] *Tuberkulose der Knochen und Gelenke.* Von Professor Dr. med. F. Oehlecker. Berlin and Vienna: Urban and Schwarzenberg. 1924. (Double cr. 8vo, pp. vi + 405; 356 illustrations. Unbound, Swiss fr. 33.75; bound, Swiss fr. 40.)

BAZAAR MEDICINES.

Colonel Birdwood, in the preface to his book *Practical Bazaar Medicines*, tells us that his attention was first directed to the subject during the war, when European medicines were both difficult to get and costly, by a recently qualified man in charge of a dispensary, who told him that he could not carry on work without a larger supply of European drugs. Colonel Birdwood consequently set to work to compile this book, primarily for the use of Indian medical men in charge of branch dispensaries.

This is not the first work on bazaar medicines to see the light. The late Surgeon Major E. J. Waring, C.I.E., I.M.S., was the author of an excellent little book on the subject, which, first published in 1860, and reaching a sixth edition in 1901, had a life of half a century. Two Indian

physicians, Drs. Kanhai hal De and Mudin Sharif, also wrote works on the subject.

Colonel Birdwood's book is divided into three parts, each arranged in alphabetical order. The first is a list of bazaar medicines, classified by their therapeutic action. The list contains several drugs which are included in the *British Pharmacopoeia*—for example, ammonium chloride, opium, catechu, iron sulphate. Among many less well known are several which are, or used to be, frequently prescribed by European as well as by Indian doctors: nim and chiretta, as bitter tonics after fever; isaphgul and khurchi, for dysentery; kamala, for tapeworm. The sherbets and antiscorbutics are in common use, among both Europeans and Indians, but as cooling drinks rather than medicines. The vernacular name, anantamul, appears twice over, as the Hindustani name of two different drugs of different therapeutic actions. The second part is a list of drugs, a short page to each, with instructions as to the preparation of infusions, etc. The third is a list of over 200 prescriptions; while a list of drugs which should be kept in stock, ready for use, in dispensaries, completes the book.

As the author states in the preface, manufacturing chemists who can make, standardize, and put on the market preparations of the more useful Indian drugs are much wanted in India.

That a second edition[5] has been called for within four years of the first shows that the book has been found useful. It is interleaved for notes, and is of a size handy for the pocket. The type is excellent, and we have not noted any misprints.

A BIBLIOGRAPHY OF SIR THOMAS BROWNE.

MR. GEOFFREY L. KEYNES, a member of the surgical professorial unit at St. Bartholomew's Hospital, has just published an elaborate and complete *Bibliography of Sir Thomas Browne*.[6] No pains have been spared to make the list complete in every respect, and it may be commended to all who wish to be acquainted with the various editions of Sir Thomas Browne's works. The volume, which makes a very handsome appearance, has as its frontispiece a reproduction of the contemporary portrait of Sir Thomas Browne and his wife. It also contains facsimiles of the first page of MS. No. 3 of the *Religio Medici*, of an autograph manuscript of *Repertorium*, of the engraved title-page of the first unauthorized edition (1642) of *Religio Medici*, and a reproduction of a portrait in oils of Simon Wilkin, whose edition of the work of Sir Thomas Browne (1836) has long been appreciated as one of the best edited books in the English language. In addition to these plates the book contains a number of reproductions of title-pages. The edition is limited to 500 copies. We congratulate Mr. Keynes upon the admirable way in which he has performed his task.

NOTES ON BOOKS.

DR. R. FORTESCUE FOX, to whom the profession already owes thanks for several volumes dealing with the therapeutic use of water, has published under the title of *Medical Hydrology*[7] an exposition of the subject based on his lectures at the University of London. The first two chapters discuss the physical properties and action of waters, and their origin, uses, and classification; also the properties and actions of baths and the different forms of the latter; the functions of the skin, and the action of heat and cold upon the human body. These initial chapters deal in short with the principles of medical hydrology, and the remainder with their application in incipient, chronic, and acute disease, as also in certain surgical conditions. Finally, the indications for their use in a variety of specific disorders are set forth, and the available hydrotherapeutic resources of the British dominions are described. As a rule the various statements are illustrated by a reference to one or more well known spas, and in speaking of specific disorders the waters suitable for their treatment are always mentioned. This fact and the laudable brevity and clearness of the descriptions of the principles of medical hydrology are likely to make the book popular among those who only occasionally have to consider the question of where to send a patient for hydrotherapeutic purposes.

The volume on *The Treatment of Infants in Private Practice*,[8] by Professor P. NOBÉCOURT and Dr. MARCEL MAILLET of Paris, forms part of the series entitled "Comment Guerir," edited by Dr. Charles Fiessinger, and like the other works in this series which we have had occasion to review, is characterized by the clearness of its exposition and its practical qualities. It deals first with individual and social hygiene, infant feeding in health and disease, external and internal medication, spa treatment and climatotherapy. The second part is devoted to the treatment of symptoms arranged according to the various systems, and the third part to the treatment of particular diseases. The volume—which, unlike most French medical books, is provided with a good index—will be found a useful work of reference by those who wish to gain some knowledge of current French pediatrics.

In our issue of June 7th, 1924 (p. 1020) we gave an account of the recent conference on mental deficiency held at the Central Hall, Westminster, under the chairmanship of Dr. H. B. Brackenbury. The full report of the conference has now been issued as a pamphlet of 128 pages by the Central Association for Mental Welfare. Copies (price 3s.) may be obtained from the Honorary Secretary of the Association, 24, Buckingham Palace Road, S.W.1.

[5] *Practical Bazaar Medicines.* With over 200 useful prescriptions. By G. T. Birdwood, Lieutenant-Colonel I.M.S., Civil Surgeon, Lucknow. Second edition. Calcutta and Simla: Thacker, Spink and Co. 1924. (Fcap. 8vo, pp. xxi + 182. Rs. 4/8.)

[6] *A Bibliography of Sir Thomas Browne, Kt., M.D.* By Geoffrey Keynes, M.A., M.D., F.R.C.S. Cambridge: The University Press. 1924. (Imp. 8vo, pp. xii + 255; illustrated. 42s. net.)

[7] *Medical Hydrology: Outlines for Practitioners and Students.* Based upon Lectures given at the University of London. By R. Fortescue Fox, M.D. London: J. and A. Churchill. 1924. (Post 8vo, pp. viii + 136; 2 figures. 6s. net.)

[8] *La Thérapeutique du Nourrisson en Clientèle.* By MM. P. Nobécourt and Marcel Maillet. Paris: A. Maloine et Fils. 1923. (Imp. 16mo, pp. 854. Fr. 25.)

MEETING OF THE BRITISH ASSOCIATION IN TORONTO.

PRESIDENT'S ADDRESS.

AT the inaugural meeting of the British Association for the Advancement of Science, in Toronto, on August 6th, the presidential address was delivered by Major-General Sir DAVID BRUCE, K.C.B., F.R.S., on the prevention of disease.

The Prevention of Disease.

He began with a reference to the loss of power entailed upon a community by sickness, and drew attention to the recent report of the English Minister of Health that over twenty million weeks of work were lost each year among English workers in England through this cause. In other words, the equivalent of the work of 375,000 people for the whole year had been lost to the State, without taking into account the non-insured population. It had lately been calculated that the financial loss in England and Wales from sickness and disability amounted to at least £150,000,000 a year. This gave some idea of the importance of preventive work, and pointed to a conclusion that medicine must change its strategy and assume the offensive instead of awaiting the attack. It must no longer be said that a man was so sick that he had to send for the doctor; the medical practitioner of the future must be able, by frequent examinations of men in health, to detect any commencing departure from it, and to teach ways of living in accordance with the laws of personal health, the public health authorities co-operating by ensuring a healthy environment. In the early days of history disease had been considered the work of evil spirits or magicians, or a punishment exacted by Providence. Some few hundred years ago it was recognized that some diseases were contagious; this led to a belief that some chemical substance escaped from the sick to the healthy, acting like a ferment, and resulted finally in the discovery of the part played by microscopic organisms. Pasteur had lifted medicine out of the region of vague speculation and empiricism and set it firmly on new ground as an experimental biological science; to him, therefore, must be dated the beginning of the intelligent and purposive prevention of disease. Lister made practical use of the discoveries of Pasteur, and the satisfactory results which followed his procedure of sterilization led him to devote the rest of his life to the improving and simplifying of the methods of preventing the infection of wounds.

Passing to the consideration of infectious diseases, Sir David Bruce took some specific examples to illustrate preventive work. He gave details of his experience with Malta fever since 1887, when the micrococcus which caused it was discovered. In spite of energetic sanitary measures, however, the disease continued unchecked for seventeen years. The Royal Society of London undertook its investigation in 1904, and in the following year the problem of prevention was solved, almost by accident. Some goats had been inoculated with the organism, and, having shown no pyrexia or other signs of ill health, they had been classed as immune or refractory to the

disease. On subsequent examination their blood was found to have agglutinable properties for the micrococcus of Malta fever. This observation led to the re-examination of the immunity of the goat, and it was discovered that about half the goats in the island were infected with this disease, and that about 10 per cent. of them were excreting the organism in their milk. Maltese milk having been struck out of the dietary of the garrison, Malta fever was practically abolished—to such a degree, in fact, that the island was used as a sanatorium during the late war. This was one way of preventing an infectious disease—the discovery of the living germ and of its natural history, and with this knowledge the designing of the procedure by which it can be prevented from infecting man. Another way of preventing bacterial disease was found in the case of typhoid fever, where hygienic measures, especially a clean water supply with good drainage, were primarily essential. When such conditions were not attainable typhoid fever could still be prevented by inoculation. This method, derived originally from the discovery of Jenner and followed by the researches of Pasteur, Haffkine, and Wright, had led to the most striking decrease in the mortality of this disease among the troops in India, in the South African war, and, more recently, in the late war, in which there were fewer cases of enteric fever than there had been deaths from that cause in the South African war. Sir David Bruce related that, at the beginning of the late war, among the French soldiers who were not inoculated there were some 96,000 cases of typhoid with nearly 12,000 deaths, whereas among the British soldiers there were only 2,689 cases and 170 deaths. Later on the French soldiers were very thoroughly inoculated, with the result that their immunity became as complete as that of the British. Antityphoid inoculation during the recent war certainly constituted one of the greatest triumphs in the prevention of disease. The third method of preventing bacterial disease—namely, by the injection of specially prepared blood serums—was illustrated by the familiar examples of antitetanic and antidiphtheritic serum, which contained the antibodies required to combat the respective diseases. Before the use of serums at least 85 per cent. of tetanus cases succumbed, but following its use the incidence of the disease fell to a little more than one in a thousand, and the mortality to less than half. During the war there were 2,500 cases of tetanus in the British army, with 550 deaths. If there had been no prophylactic injection of antitetanic serum there would probably have been 25,000 cases with 20,000 deaths. It had been stated that the introduction of antidiphtheritic serum in 1894 had reduced the death rate from 40 to 10 per cent., and if used on the first day of the disease to almost nothing. Preventive measures in diphtheria had recently come into vogue, and an active immunization had been effected by a mixture of toxin and antitoxin in individuals who had been shown by the Schick test to be susceptible to the disease. Passing to the subject of tuberculosis, the President spoke of the progress made since the discovery of the bacillus in 1882, though even before Koch's discovery a considerable amount had been done in the way of prevention. Edmund Parkes, professor of hygiene in the Army Medical School, had reduced to a great extent the incidence of tuberculosis in the British army by procuring for the soldier more floor space and more air space in the barracks. General von Moltke, hearing of the death of Parkes, said that every regiment in Europe ought to parade on the day of the funeral and present arms in honour of one of the greatest friends the soldier ever had. The prevention of disease depended fundamentally on the provision of a better environment and the education of the people in physiological living. It had been recently demonstrated that the disease was usually acquired in childhood—a fact of great significance, since with early diagnosis and the placing of the child under good conditions, effective resistance and even immunity against a second attack could be established. Latent tuberculosis, by preventing the second invasion, seemed to be definitely advantageous, as was shown by the experience of Metchnikoff in a part of Siberia where the tubercle bacillus was unknown. He had discovered that many of the emigrants from this safe country into the big cities died of acute and rapid tuberculosis, and similarly the Senegalese, who were also free from tuberculosis in their native condition and were found to be free from the disease on reaching France during the late war, developed an acute and fatal form of tuberculosis subsequently, in spite of the hygienic measures enforced by the army authorities. The curious conclusion followed that if any country cleared itself of the tubercle bacillus it would appear to establish thereby a grave risk for any of its inhabitants who migrated into a neighbouring country. Preventive measures against tuberculosis included improvement of the general hygienic conditions, provision of methods of early diagnosis, preventive treatment, and isolation of the more infectious patients; and, thirdly, the use of tuberculin, though in this great caution must be exercised in assessing the claims advanced. These and other measures, including attention to the supply of pure milk, had been embodied in antituberculosis schemes in England and America, with the result that in 1920 Washington had a death rate of only 85 per 100,000 of the population, Chicago 97, New York 126, and London 127. Other nations had not been so energetic in preventive measures, and the death rate in the same year in Paris was 279 and in Vienna 405.

Protozoal diseases were next considered, and were illustrated by tsetse-fly disease and sleeping sickness. Sir David Bruce gave details of the investigation of the Zululand outbreak of this disease in 1894, with which he had been closely associated. The detection of the trypanosome in the blood of the diseased cattle was followed by the discovery of the part played by the tsetse-fly, and the chain of infection was traced; preventive measures were then rendered possible. This work led to the discovery in 1903 of the cause and of the possibility of preventing sleeping sickness, which was also found to be correlated with the distribution of the tsetse-fly. In the large group of infectious diseases of which the parasite was either unknown or doubtful, small-pox and rabies were now preventable. Trench fever, which came into such prominence during the late war, had been previously recognized in Poland, where it was called Wolhynia fever. It became one of the most powerful factors in reducing our man-power, there being probably more than a million cases among the allies on the Western front. In 1917 in the British army alone 20,000 out of 106,000 admissions to hospital were cases of trench fever. After the discovery in 1916 that the blood of trench fever cases was infective, research steadily proceeded, and the United States on coming into the war also co-operated. The discovery that the louse, and the louse alone, was responsible for the spreading of the disease made preventive measures possible, and there could be little doubt that if the war had lasted longer, trench fever, like tetanus, would have practically disappeared. The prevention of typhus fever was similarly rendered possible by the discovery of the part played by the louse.

The discovery of deficiency diseases, and the part played in them by the substances known as vitamins, brought into prominence another line of prevention of disease. As far back as 1747, James Lind, a surgeon in the British navy, had carried out experimental observations on sailors suffering from scurvy, which had to a certain extent anticipated the latter investigations. The work of Holst and others in Copenhagen, published in 1907 and 1912, formed the basis of the numerous researches carried out since in England and America, and the classic experiments published by Hopkins in 1912, established the importance of vitamins beyond a doubt. Sir David Bruce dealt in considerable detail with the importance of these vitamins and the relation of deficiency diseases to hygienic conditions. He then passed, in conclusion, to the diseases associated with morbid conditions of the ductless glands, and gave illustrations of the way in which disease of these glands can be prevented as well as cured. The activities of the Rockefeller Foundation were promoting the well-being of mankind throughout the world; science knew no boundaries of nations, languages, or creeds. Man had now come out of the gloom and shadow of the Dark Ages into his heritage, and seemed to possess some particle of the universal curative forces which enabled him to wrest from Nature the secrets so jealously guarded.

The Sections.

The sections this year are as follows: Mathematics and physics, chemistry, geology, zoology, geography, economic science and statistics, engineering, anthropology, physiology, psychology, botany, educational science, and agriculture. Dr. H. H. Dale, C.B.E., F.R.S., is president of the Section of Physiology, and his address on progress and prospects in chemotherapy appears in this issue on p. 219. On the same day Professor A. B. Macallum, F.R.S., read a paper on the absorption of organic colloids by the intestinal mucosa; other subjects dealt with included the part played by the adrenals in metabolism and the chemical control of body temperature, the activity of iodothyroglobulin and its digest-fractions as compared with thyroid secretion, and experimental aortic regurgitation. A popular lecture was delivered by Professor J. C. Drummond on cod-liver oil. The President of the Section of Anthropology is Dr. F. C. Shrubsall, who gave an address on health and physique through the centuries. Other papers read included one on new trends in anthropology, by Mr. Charles Hill-Tout, and another by Dr. C. Wissler, on the segregation of racial characters in the population. The Section of Psychology, under the presidency of Professor W. McDougall, F.R.S., considered on August 7th the classification of instincts, feeling and emotion in daily life, and other more technical subjects.

British Medical Journal.

SATURDAY, AUGUST 9TH, 1924.

THE BRADFORD MEETING.

One of the advantages of holding the Annual Meeting of the British Medical Association in a different town each summer is the varying "local atmosphere." Thus, although the general pattern of organization changes little from year to year, each gathering of the profession has an individuality of its own. The Bradford meeting is now an event of the past, but it will long be remembered by those who took part in it as one of the most instructive and agreeable ever held. Bradford, as the centre of the world's wool textile industry and a city whose corporation is well known for its enterprising health policy, has special features which claim the attention of those engaged directly in preventive medicine and public hygiene. While not a university town, it is an important medical centre, with large hospitals and kindred institutions which have grown up to meet the needs arising from an intensely rapid increase of population during the past hundred years. Bradford is the centre also of a wide tract of interesting country, and the Annual Meeting of 1924 has been remarkable for the number and variety of the excursions provided.

It has been well said that the Scientific Sections of the Annual Meetings form a common meeting ground for consultant, specialist, and general practitioner. The character and scope of the work of the twelve sections which met at Bradford will appear from the short summary of proceedings printed in our last issue. The debate in the Section of Medical Sociology on the National Insurance system was reported at length last week, and the opening session of the Section of Public Medicine is fully reported at page 227 this week. In subsequent issues we shall complete our full reports of the work of all the sections. Here we need do no more than remark on the keenness and the practical spirit which to the onlooker seemed to characterize all the scientific and clinical discussions. Much interest was shown, too, in the Pathological Museum, arranged by Mr. F. W. Goyder and Dr. Buckell on the top floor of the Technical College, and in the demonstrations with which several of the sections rounded off each day's programme.

Medico-political business and the Association's domestic affairs occupied, as usual, the four week-days preceding the sectional meetings. The full report of the proceedings of the first three days appeared in the Supplement of July 26th, and the conclusion was recorded in the same detail last week. Some idea of the debates and decisions of the Annual Representative Meeting has already been conveyed in the outline sketches published in the Journal of last week (p. 208) and the week before (p. 154). With this meeting at Bradford the Representative Body reached its twenty-first year, and a general desire was shown to celebrate the coming of age of what, under the reformed constitution of 1904, was set up as the governing body of the Association. Dr. Bolam's account of his stewardship as acting treasurer revealed a very healthy position, both in money matters generally and in regard to the finance of the Association's new building in Tavistock Square, which it is hoped will be ready for occupation next year. Equally satisfactory were the figures of membership presented by the Chairman of the Organization Committee. The number of members at the close of last month was 27,588, surpassing all previous figures. As Dr. Morton Mackenzie remarked, an association which has increased its membership by over 10 per cent. in one year, as ours has done, must be in a very healthy working condition. This "record" membership he attributed partly to the belief, which is spreading more rapidly now than ever before, that the Association is willing to take up anything which it feels will help its members, and partly to the efficient way in which the work is done both at headquarters and at the periphery. For detailed information on the many other topics of professional interest brought forward and debated at Bradford under the able chairmanship of Dr. Wallace Henry members must turn to the very full reports published in the Supplement and the running commentaries in the Journal.

The success of the first meeting that the British Medical Association has held in Bradford was due to the admirable arrangements made by the Local Executive Committee under the leadership of the President, Mr. Basil Hall, and the indefatigable Honorary Local Secretary, Dr. W. N. West Watson. Only those who have been behind the scenes on such occasions can realize how much foresight, how much hard work, and what organizing skill are necessary to ensure smooth running in every wheel of the machine. "Nor was hospitality, one of the main virtues of Yorkshire, wanting"; and the warmth and friendliness of Bradford's reception, which was typified in the genial person of the President, will remain in the memory of every visitor. It is, we believe, an open secret that when the Annual Meetings were revived after the war Dr. West Watson set his heart on welcoming the Association to Bradford; he can now look back with satisfaction upon the outcome of many months' work. Among the colleagues who helped him to accomplish his aim only a very few can be named here, but some further acknowledgement of individual services will be found in our report of the closing business of the Representative Meeting, and in the delightfully informal speech made by Mr. Basil Hall at the Annual Dinner, both published in last week's Supplement. Special mention should be made of Dr. W. F. Rawson, the local treasurer, who devoted himself to the raising of the guarantee fund and succeeded in his task. All the arrangements for providing hospitality in and around Bradford were made by Dr. Margaret Sharp, the chairman, and Dr. R. A. Lankester, the honorary secretary, of the Hotels and Lodgings Subcommittee. Another name is that of Dr. B. Wade, who drew up the long list of excursions, arranged for all the transport, and borrowed private cars for the various trips. Much good work was done, too, by Dr. A. Manknell, chairman of the Reception Rooms Subcommittee. Lastly must be mentioned Dr. J. Hambley Rowe, who made himself responsible for compiling and editing the *Book of Bradford*; he planned the contents of this attractive volume and organized his team of writers. In collaboration with Dr. Wade he prepared also the excursions handbook, which many visitors have kept as a memento of the successful Annual Meeting of 1924.

CHEMOTHERAPY.

Dr. H. H. Dale's presidential address, delivered to the Section of Physiology at the British Association meeting this year in Toronto, and published this week at page 219, embraces an account of the recent work—that is, work accomplished within the last twenty years—in that branch of pharmacology which has come to be known as chemotherapy, which he defines as the specific treatment of infections by artificial remedies. The home of the inception of insulin being Toronto, Dr. Dale naturally began his address by a reference to insulin, "which opened up new vistas of knowledge to exploration and brought relief to unmeasured misery."

Some years ago the fact had been slowly forcing itself upon those engaged in experimental medicine that in certain forms of infection the body was unable to produce antibodies of sufficient potency to eliminate the infection and leave the patient immune. Ehrlich conceived the idea of synthesizing substances with an affinity for the protoplasm of the parasite causing the disease, and none for the host; to this general principle he applied the term "chemotherapy." Ehrlich considered that his drugs combined directly with the protoplasm of the parasites, and he spoke of chemoreceptors, and, indeed, all this work was pictured by him in terms of his side-chain theory. This idea was in no way new. Professor Langley of Cambridge had previously enunciated the same hypothesis and put forward facts to substantiate his views. But Langley was engaged in exploring physiological phenomena and Ehrlich the cure of disease.

It is interesting and stimulating to note that several very important results have been obtained from this type of research. The treatment of spirochaetal infections—syphilis, yaws, and relapsing fever—has been revolutionized; Leishmania infections, kala-azar, Baghdad boil, and bilharzia infections, are curable; trypanosome infections are now within the range of effective treatment. Practically all these are tropical diseases, and in consequence of the control under which medical research has brought them the tropics are becoming habitable by the European. It is our misfortune that no such progress can be reported for our own endemic diseases; the treatment of tuberculosis, pernicious anaemia, Hodgkin's disease, rheumatoid arthritis, and many others, has advanced little during the past twenty years.

Ehrlich's early interest in the synthetic dyes and their selective action on certain cells of the body naturally led him to experiment first with a large selection of such dyes. The first of these to give promise of cure was trypan red; this observation led other workers along the same path to the discussion of trypan blue, which has had a practical success in the treatment of piroplasma, an intracorpuscular parasite in animals. The remarkable fact was early noted that trypanosomes treated with dye *in vitro*, though not stained or visibly harmed, had nevertheless lost their power of infection. Dr. Dale goes on to describe the discovery of "205," which not only frees an animal from trypanosomes in a few days, but may render it resistant to further infection for months; this substance also has little effect on the trypanosomes when applied to them directly; and he produces evidence leading to the conclusion that the affinities of "205" for the constituents of the host's blood and tissues must play an important part in its curative properties.

Dr. Dale then passes to the organic compounds of arsenic, and here again he shows that the tissues must change these derivatives, perhaps from the pentavalent to the trivalent form, before they become curative. Time no doubt prevented him from discussing why the trivalent compounds given directly are no more curative than arsenious acid. The guess may be hazarded that these organic compounds of arsenic act because they first get into the cell owing to their lipoid solubility, and subsequently undergo change there to the trivalent or active form. Voegtlin's suggestion that they act by combination with a sulphydride grouping is particularly interesting at a time when Hopkins has shown the importance of one such sulphydride compound as a normal constituent of the body tissues. In describing his own work on amoebic dysentery Dr. Dale shows how emetine is only effective in curing this condition in the body, and is relatively inactive when applied directly to the parasite.

At the root of Dr. Dale's thesis is the principle that the remedy does not kill the parasite directly, but acts in some other way: it may be by lowering the resistance of the parasite to the natural defences of the body, or it may be by undergoing conversion within the body into some substance toxic to the invader. This principle certainly applies to the dyes, to organic compounds of arsenic, antimony, and bismuth, and to emetine; the effect of quinine in malarial conditions is more difficult to explain. The original significance of the term "chemotherapy" has therefore gone, and if the term is to be retained it must be understood as meaning something quite different from the connotation which Ehrlich originally gave to it. It means a drug treatment in which the drug, by acting on the body tissues, so modifies their metabolism as to enable them to destroy the parasite; or a treatment in which the drug is retained in an inactive form by certain cells in the body, and is slowly changed and set free in an active form which is lethal to the parasite.

MEDICAL WORK AT WEMBLEY.

Those who have had practical experience of a medical organization which has to deal with such multitudes as daily visit a great exhibition will at once realize that the requirements are many and varied. Exhibition crowds are made up of all classes and all ages from early infancy to extreme old age. It is therefore incumbent on those responsible for their welfare to anticipate and provide for the necessities that these extremes dictate, and the environment peculiar to an exhibition makes demands apart from the medical and surgical happenings ordinarily associated with communal life. The medical organization of the exhibition is arranged to render early assistance to all cases requiring first-aid treatment, and, should medical attention be considered necessary, their rapid conveyance by ambulance car to the main ambulance station, where a medical officer is on duty day and night. To enable this to be carried out first-aid cabinets are placed in the great Palaces of Engineering and Industry and in the exhibition grounds. An orderly of the St. John Ambulance Brigade or the British Red Cross Society is on "sentry go" at each cabinet. The cabinets are in telephonic communication with each other and with the four ambulance stations. The latter are staffed by men and women belonging to the Order of St. John of Jerusalem or the British Red Cross Society, and are, with the exception of the main ambulance station, named, according to position, Northern, Eastern, and Stadium. These in turn can communicate in the same way with the "first-aid" headquarter office, and also with the office of the Director of Medical Services, both situated in the Stadium. The motor ambulances are garaged at the main ambulance station, and are provided

and manned by the St. John Ambulance Brigade and the British Red Cross Society. On receipt of a message from any cabinet or station a car, accompanied by orderlies, is dispatched to the spot. The patient is then brought direct to the main ambulance station and treated and discharged, or, if necessary, sent by ambulance car home or to hospital. If it is decided that the patient requires hospital treatment he is sent by car to the Willesden General Hospital. The council of the Willesden General Hospital has placed thirty beds at the disposal of the medical service of the exhibition, and has also supplied the trained nurses for the main ambulance station, which is therefore, in military parlance, the casualty clearing station of the exhibition. The cases that it deals with are surprisingly varied in character and severity. This must be expected with a changing daily population of between one and three hundred and fifty thousand—last Whit-Monday's census. The numbers already treated exceed 11,000, and though the cases have been mostly trivial, some 300 must be classed otherwise. Among the latter have been: cases of fracture 12, dislocations 5, perforated duodenal ulcer 5, appendicitis 4, and gastro-enteritis 87 (all in one day). Of the last named the BRITISH MEDICAL JOURNAL has already published a preliminary report. The fractures included three of the shaft and one of the neck of the femur, and one of the lower end of the ulna—an unusual position. Among the dislocations were three of the shoulder, all reduced and all returned home; and one of the terminal phalanx of the great toe backwards. Persons, old and young, frequently fall into the lake, and though little harm is done they must be put to bed while their clothes are drying. It was found necessary to accommodate batches of ex-soldier paraplegics for the relief of urinary difficulties. The Amusement Park provides occasional accidents, but few are other than slight; and the menagerie there provides its quota of slight wounds from twisting the lion's tail, or the retaliatory defensive measures of irate bears, monkeys, and other animals. Auto-intoxication due to fatigue is a common complaint among elderly folk and children, following long journeys frequently undertaken at night with little rest or sleep, combined with unsuitable and irregular meals. They are treated by rest in bed and dieting. Headaches require relief, and are due to the same cause. Aged men with prostatic trouble, ofttimes leading to distension with overflow, require catheterization; elderly females with colotomies or pessary displacements sometimes wish for readjustments; and excursionists by railway or charabanc with abdominal colic from repletion seek anodynes. When it is stated that over 84,000 ices were sold one day in the exhibition this is not surprising, as there can be no limitation except the pocket to individual desires. Epileptics and hysterics respectively demand bromides and sympathy. Cowboys and cowgirls, whose very livelihood and chances of prize money depend on their sticking to their jobs, naturally avoid falling into the doctor's hands, but sometimes necessity compels where they have fractured a bone. It was then that the portable radiographs proved useful; on receipt of a telephone message the specially designed car plant arrived with an expert operator, and an excellent radiograph was produced within twenty minutes of the exposure. Numbers of natives of India and of other Eastern dependencies are employed in the exhibition, and their sick requiring hospital treatment are sent to the Seamen's Hospital, Greenwich, by motor ambulance. All infectious cases are sent by special motor ambulance car to the local infectious hospital at Acton. Parents visiting the exhibition with infants in arms or children of tender age find provision for caring for them at the day nursery established in the north-west corner of the exhibition grounds, and adjacent to the Wembley Park Station of the Metropolitan Railway. It is a delightful home, in picturesque surroundings, and is replete with all the comforts and requisites that a parental solicitude might wish for or a child's heart desire. The mural paintings depict scenes from well known nursery rhymes, and the number and variety of the games and toys must amuse and satisfy children of all ages; they are quite in keeping with general efficiency and the hygienic feeding and nursing of its inmates. The fee for a four hours' stay is sixpence, and there is a small extra charge for feeding. The day nursery is largely patronized, and Her Majesty the Queen has expressed approval of its general arrangements. It is organized by the Central Council for Infant and Child Welfare, and is under the auspices of the British Red Cross Society. The number of children admitted since the opening of the exhibition exceeds 5,000. It therefore fills a real want, and is especially appreciated by nursing mothers. Sanitary inspections of the exhibition buildings, restaurants, Amusement Park, and grounds generally, form part of the daily routine of the medical authorities. Sanitary reports are sent in to the chief administrator daily. The medical staff of the exhibition consists of a director and four medical officers, one of whom is the medical officer of health for Wembley and another a lady (Dr. Marjorie Thompson). There are two dispensers, and three ex-R.A.M.C. men as orderlies. The St. John Ambulance Brigade and the British Red Cross Society have provided all the first-aid personnel (80 to 100 are on duty daily), much of the ward equipment, and all the surgical dressings and drugs used since the exhibition opened. The exhibition authorities and the British public are therefore indebted to these societies for what they have so ungrudgingly and unostentatiously done and given on humanitarian grounds.

BISMUTH FOR LUNG MAPPING.

INTEREST has been raised by recent communications to the medical journals of Paris and London describing the uses and technique of injections of lipiodol into the tracheo-bronchial tree, and it is in consequence desirable to consider what other methods have been designed to serve the same purpose. In particular the insufflation of bismuth in the form of powder has an important place, not only because of certain advantages apparent on consideration, but also because the method is one introduced and recommended by so experienced an authority as Dr. Chevalier Jackson. If it be desired to examine any particular part of the tracheo-bronchial tree in a patient suspected of bronchiectasis, lung abscess, or penetrating foreign body, the first step consists in the introduction of a bronchoscope through the mouth of the anaesthetized or conscious patient. Should the condition be one in which collections of pus are present or suspected in parts of the lungs it is desirable to use an aspirating bronchoscope, not only to permit of a clear view, but also to prevent spread of pus into neighbouring healthy areas. After localization and cleansing of the affected region, visual examination will give valuable information as to the condition of bronchi or bronchioles, especially as to the presence of any granulations liable to prevent the free drainage of pus. Local treatment may, of course, be carried out at the same time. Having gained what information is available by inspection, the next step consists in introducing a long metal tube charged with dry powdered bismuth, preferably in the form of subcarbonate, through the bronchoscope. The contents are discharged by compression of a rubber bulb on the proximal end of the insufflator. The powder adheres to the walls of bronchi and bronchioles; it will make visible even fine ramifications of the air tubes, and will demonstrate any dilatations or cavities, in radiograms taken in the antero-posterior and lateral planes. Stereoscopic views

will be especially useful, and will show the relations of an opaque foreign body which has entered the lung; an exact determination can be made as to the position of a fragment lying within an air tube or outside, and by such an examination Dr. Jackson has been greatly helped when dealing with penetrating projectiles. The advantages of the method depend in part on the fact that the mapping is carried out under visual guidance and is limited to that particular area of the lung which is suspected of pathological changes; furthermore, the powder adheres to the walls of the tubes and does not gravitate in the same way as liquids. Bismuth, it is said, is without any ill effects when insufflated into the lungs, and is, in fact, described as exerting a beneficial influence on infected areas. Further details may be obtained from Dr. Jackson's paper in the *American Journal of Röntgenology* for October, 1918 (p. 454), from his paper in the *Annals of Surgery* for October, 1923 (p. 501), and from Dr. Louis H. Clerf's article in the *Surgical Clinics of North America*, vol. 4, No. 1.

AFTER-HISTORY OF SANATORIUM PATIENTS.

THE Medical Research Council has issued a report on the after-history of patients treated at the Frimley Sanatorium during the years 1905 to 1914.[1] The Council has previously supported two similar investigations into particular modes of treatment of tuberculosis—namely, the results of sanatorium treatment at King Edward VII Sanatorium, Midhurst,[2] and a study of tuberculosis in insured persons accepted for treatment by the City of Bradford Health Committee.[3] A further investigation on similar lines at King Edward VII Sanatorium, Midhurst, is shortly to be published, and these, together with the present report on the experience at Frimley, will complete the series of studies of the problems of the sanatorium. The Brompton Hospital Sanatorium, Frimley, was opened in 1904. It is a daughter department of the Brompton Hospital, London, with which it keeps in close connexion. With very few exceptions every patient passes through a period of observation and treatment at the parent hospital before he or she is considered eligible for the sanatorium. Thus a judicious selection of cases favourable for sanatorium treatment is made in London, and the same visiting medical staff is enabled to follow the progress of patients as they pass from hospital ward to open-air conditions. The tracing of patients discharged from sanatorium or hospital is always difficult work, and the difficulties were increased in this investigation because of the general shifting of the population during the war years. Thus it was discovered at the beginning of this research that out of 3,400 patients treated during the years under review, nearly 1,400 (more than one-third) had been lost sight of, this being disclosed by the fact that when a circular of inquiry was sent to every patient in 1918 quite one-third of the letters were returned by the Post Office marked "Unknown at address." However, after painstaking efforts, including advertising in the press, a personal canvass at every known address, and a study of the returns of the Registrar-General, the authorities succeeded in obtaining information of over 1,000 of the 1,400 patients untraced when the investigation started, so that only 343, or almost exactly 10 per cent., had finally to be put down as definitely lost sight of. For the purpose of this investigation the condition of patients on admission to the sanatorium was classified in the following way: Group I, incipient cases; Group II, moderately advanced cases; Group III, far advanced cases. The results of treatment as revealed at discharge from the sanatorium were grouped as follows: arrested, much improved, improved, stationary, worse. The first phase of the inquiry was the determination of the mortality of patients according to the condition on admission, and a comparison of these figures with the standard death rates for the general population. It was found that for every death expected by the standard table, experience showed that the deaths which actually occurred were: in Group I 4, in Group II 16, and in Group III over 40. In the first few years after discharge there appeared to be a fall, not only in the excess mortality, but also in the mortality rates actually experienced. The mortality experienced by patients treated at Frimley, in its main aspects, confirmed that previously shown to have been experienced by patients treated at Midhurst. The next phase was to determine the mortality according to the condition on discharge. It was found that in Group I exactly 75 per cent. were discharged "arrested," and only about 2 per cent. were "worse"; while in Group III only 4 per cent. were discharged "arrested," and over 30 per cent. were "worse"—the latter figures showing that beneficial results of a permanent nature are to be expected only in a minority of Group III patients. Each group of patients discharged "arrested" experienced lower mortality than those discharged in other conditions. The large majority of patients discharged "worse" died soon after discharge, about one-half of the deaths occurring in the first year. Thus the prognosis of patients arrived at by the medical officers may be regarded as a reliable guide as to the heaviness or otherwise of the mortality subsequently to be experienced. Interesting results were brought to light by the determination of mortality according to the presence or absence of the tubercle bacilli in the sputum. The mortality of patients who showed negative sputum on discharge, even if reversing the result of the test at admission, is much more favourable than when at discharge the sputum was found still to be positive. One of the most important factors in a favourable prognosis is the disappearance of the tubercle bacilli from the sputum. From the figures collected in this report statistical evidence is found to support the opinion of experienced clinicians that the earlier the stage when the disease comes under sanatorium treatment the greater is the chance of survival. In the early cases of Group I, 79.3 per cent. of the male patients and 89.7 per cent. of the female survived five years, the corresponding number of survivors after ten years being 65.2 per cent. and 85.2 per cent. respectively. The results of the treatment of Group III—the far advanced cases—were not satisfactory. Of those discharged worse 93 per cent. were dead when observations closed in 1918, and of these deaths 58 per cent. occurred in the first year after leaving the sanatorium. The results with Group II—the moderately advanced cases—showed that 56.8 per cent. of the male patients were alive at the end of five years and 38.2 per cent. at the end of ten years, and 67.4 and 49.7 per cent. respectively of the female patients. In such a grave disease as pulmonary tuberculosis, already in its second stage, such figures justify sanatorium treatment, though we may trust that in the future some more direct therapeutic measures may come to be associated with it, enhancing its value.

[1] Medical Research Council Special Report No. 85: An Inquiry into the After-histories of Patients Treated at the Brompton Hospital Sanatorium at Frimley during the years 1905-1914. By Sir Percival Horton-Smith Hartley, R. C. Wingfield, and J. H. R. Thompson.
[2] Published in the Special Report No. 33, 1919.
[3] Published in Special Report No. 76, 1923.

CANCER RESEARCH.

A FURTHER memorandum on cancer[1] has been sent to local authorities by the Ministry of Health. It surveys the main lines of experimental research during recent years, and summarizes the broad conclusions which seem to be deducible. It is hoped that such a statement may be serviceable to those who are now considering experimental cancer investigation as a whole, and the directions in which

[1] Circular 516. London: H.M. Stationery Office. Price 1d.

particular researches require to be started or continued. This memorandum is, in the main, the work of Dr. J. A. Murray, director of the Imperial Cancer Research Fund. Commencing with an outline of the history of cancer research, reference is made to the chief theories which held the field at the opening of the present century—namely, the irritation theory of Virchow and the embryonic rest theory of Cohnheim. Very little success has attended the experimental work concerned with the second theory, but since 1915 the continued application of tar had been shown to induce the formation of a growth displaying the two typical features of cancer—unlimited power of multiplication and ability to form metastases. This step, supporting the first theory, constituted a great advance, and is dealt with in some detail in the memorandum. Two main subjects are considered. In the first place, the properties of cells already cancerous have been investigated after experimental transference from one animal to another. This line of research was started as early as 1889, but its importance was first properly appreciated in 1902; it indicated that it was unnecessary to cite the hypothesis of altered metabolism to explain the continued growth of a cancer—the seed rather than the soil was the important factor. The question of immunity or resistance to transplantation was investigated, and it was realized that a certain natural immunity existed in the majority of persons. Moreover, animals having been once unsuccessfully inoculated had proved to be resistant to a second inoculation, even of considerably more active material. This resistant state could be established also by preliminary treatment with normal tissues, if intact living cells were used: it was only effective against subsequent grafting, and was without effect on established tumours. The most energetic measures of immunization were found to have no influence on the progress of primary cancer. The study of cancer metabolism brought to light the fact that there were slight but constant differences between normal and cancerous tissues outside the body. The water content of cancerous tissues was found to be greater than that of normal tissues, and the more rapidly growing tissues had a higher proportion of water and of potassium salts, and had a lower calcium content, a feature common to young and embryonic tissues. Accessory food factors in relation to cancer were studied, and it was not found that deficiency of vitamins A and B exerted any marked influence on the growth of transplanted tumours. Tissue culture outside the body showed that tumours produced substances poisonous to themselves, and frequent replacement of the culture medium was neccessary if growth was to continue. These toxic substances were innocuous to the growth of normal tissues. Embryonic tissues and tumours proliferated immediately when planted out in a suitable medium, but adult tissues only began to grow after an initial delay, which could be cut out by adding to the culture medium an autolysate of normal damaged tissues. Rapidly growing transplantable tumours extracted without autolysis gave an extract with the same properties. Thus the process of malignant new growth was brought into close relation with the processes of tissue repair after injury. The investigation may possibly result in a method of distinguishing true new growths from rapidly growing tumours due to other causes, such as tuberculosis and syphilis. The second part of the memorandum deals with the experimental study of the changes by which cells become cancerous. This was based on two possibilities—the hypothesis of a microbic, embryonic, or gametic origin, and, secondly, the conception of Virchow, that chronic irritation was of great importance in the production of cancer. None of the experiments under the first heading led to the production of a new growth of more than temporary character, but radiant energy, certain animal parasites, and chemical irritants, such as tar, proved to be effective in producing new growths. This line of research is being actively pursued at present.

LES VOSGES.

An old member of the Association now abroad writes to the effect that those who have not yet decided how to spend their summer vacation might do worse than to pay a visit to the north-eastern corner of France. It is an area of France much less well trodden by English feet than many which are no more easily reached and in some respects less attractive. Though parts of it now figure officially under other names, all its inhabitants still call themselves "the people of the Vosges." In the mass they are a cheery, good-tempered race, though familiar for at least ten centuries with death and misery as the outcome of war. For the Vosges has always been the scene of battles between different leaders—the Dukes of Lorraine and of Burgundy, the kings of France, the emperors of the Holy Roman Empire, and more recently modern France and modern Germany. Its chief town is Nancy, just north of which lies Verdun; just to its east lies the frontier which, for fifty years, deprived France of its natural bulwark—the Rhine. Much of it is mountainous, and all of it is hilly and well wooded, calling to mind some parts of North Wales. The fact that the people are mostly bilingual and have both a Teutonic and a Gallic element in their blood makes them an interesting study in point of view of folklore and of natural characteristics. Since little of the country lies below an elevation of 700 ft., and most of it is much higher, the general atmosphere is of a stimulating kind. There are also opportunities for study in the shape of the medicinal springs, of which there are quite a number. Included are some of widespread repute, such as those at Plombière, Vittel, and Contrexéville. Others less well known, but probably with equal claims to therapeutic respect, are Bains-les-bains, Luxeuil, Martiny-les-Bains, and Bussang, the latter having the advantage of lying at an elevation of about 2,000 ft. and being surrounded by pine woods—an excellent place for Oertel and other like exercises. Hotel accommodation is plentiful, though in the best known, and therefore more fashionable, towns it may be well to secure it in advance. The prices, when translated into English money, rule low, and a stay, even in one of the more palatial establishments at the fashionable spas, is not expensive when compared with the cost of a similar stay at an hotel of the same class in Great Britain. From the larger spas it is easy and inexpensive to visit like places and others of interest by taking a seat in a public motor car, and from Nancy it is easy to visit, in the same way, Verdun and the St. Mihiel salient. From Verdun, naturally, the whole of the line lying between the heroic city and Rheims can easily be explored. Our correspondent noted with regret that the degree to which the country has been restored is very much less than he had been led to believe from what he had seen in the papers. In parts, even wire entanglements have not yet been cleared away, and large blocks of country, besides being practically treeless, are still uncultivated. The foundation causes seem to be multiple: lack of rebuilt villages sufficiently near these lands to make them easily cultivable; the destruction of farms and the deaths of their owners; the inherent drawbacks of peasant proprietorship; and, finally, the inability of the French Government to advance with adequate speed the moneys necessary for land clearing and rebuilding operations. It might have been expected that the villages and small towns, when rebuilt, would be arranged on modern town-planning lines, but this is not the case. Small property ownership again stands in the way, with the result that the new villages tend to be tangled congeries of buildings and lanes just as their originals were, but much

less picturesque. In a German stronghold buried in a wood, and still practically in its original condition, our correspondent found evidence of the care our late enemy took of himself when he had time; besides being built of concrete and iron, and for the most part below the surface, the construction had a damp-proof course.

ANNUAL MEETING NOTES.

The Popular Lecture.

The Popular Lecture was delivered in the Mechanics' Institute, Bradford, on the evening of July 25th, to a larger audience than has gathered for this event in recent years. The lecturer was Sir Henry Gauvain, and his address on the sun cure is printed at page 234. He illustrated his remarks by lantern views of his little patients at Alton and Hayling Island, some of them showing the condition of the child on admission and again after he or she had been subjected for six months or so to the healing influences of sun and wind and (at Hayling) sea. The improvement in posture, in musculature, and in the clearing up of lesions was vividly brought out, and the photographs showed, perhaps to an exaggerated degree, the pigmenting which, said Sir Henry Gauvain, accompanied the cure. Children who failed to pigment did less well. A point brought out in the photographs was the enjoyment of the children, who were generally quite oblivious of the fact that any treatment was in progress. The President (Mr. Basil Hall), who occupied the chair, said that it was sixteen years since Sir William Treloar, then Lord Mayor of London, established the Alton institution, which was now recognized as a national asset for the treatment of poor children suffering from surgical tuberculosis. He was afraid that so far as Bradford was concerned they would have to rely upon artificial heliotherapy if they were to undertake any cures of this kind, but there was some hope that these artificial means might be perfected. Sir Jenner Verrall, in proposing a vote of thanks, said that for many years most people thought of tuberculosis as being entirely pulmonary in its character; the recognition that it could be a scourge in other ways was of fairly recent date. He thought that that evening the ideal of a popular lecture had been fulfilled, in that the subject was one in which the public was interested, and the exposition of that subject was in the hands of a man who was a master of it. Dr. H. B. Brackenbury, in seconding the vote of thanks, said that many general practitioners would like to see their results exhibited by the same graphic and comparative method, but this was only possible in the case of patients under such control as obtained at Alton. He asked what was the actual time the children had to stay at Alton before such results as those shown were brought about. Sir Henry Gauvain said that the time varied very greatly. In some of the cases which he had shown six months only elapsed between the condition of gross deformity found on arrival and the comparative straightness of limb and healing of lesions shown in the second photographs. The average duration of the stay at Alton was about fourteen months, but he had some children who had been there for as long as six years, and the one thing of which they were proud at the Lord Mayor Treloar Cripples' Hospitals was that as long as a child could be improved so long could that child remain.

The Book of Bradford.

Every member attending the Annual Meeting of the British Medical Association at Bradford received a copy of the *Book of Bradford*,[1] edited for the Publications Committee by Dr. J. Hambley Rowe, whose articles on the history and institutions of Bradford have appeared from time to time in our columns during the past nine months. It is a handsome volume of more than 250 pages, with many illustrative plates, including as a frontispiece a portrait of the President, Mr. J. Basil Hall, who contributes a short preface. In its pages will be found an account of some of the historical matters connected with the city of Bradford, its industries and its growth, its notabilities and its medical institutions. The material is arranged in thirty chapters of varying length, each contributed by some local authority upon the subject of which he treats; of the twenty contributors no fewer than nine are medical men. The book, with its clear print, neat binding, and profuse illustrations, forms a very pleasant introduction to the city, its manufactures and antiquities, and its institutions, and reflects the greatest credit on Dr. Rowe and those associated with him. The arrangement of the earlier sections is in the main chronological. Dr. Rowe's opening chapter on prehistoric vestiges is followed by notes on Roman affairs in the West Riding by Dr. Francis Villy; on the Anglian and Danish occupation, by Mr. Butler Wood; on Norman and Plantagenet times, by Mr. W. H. Barraclough; and on the Tudor period, by Mr. W. E. Preston. Mr. W. Claridge takes the story of Bradford into the seventeenth century, and Mr. H. J. M. Maltby writes of developments in the Hanoverian period. The trade and industries of Bradford are described in a group of short notes by Mr. Maltby, with a longer chapter on the textile industry by Mr. W. H. Sawyer. The geology of the district is discussed by Mr. H. E. Wroot, the flora by Mr. J. Beanland, and the fauna by Mr. F. Rhodes and Mr. W. P. Winter. Dr. Rowe contributes notes on the learned societies, the buildings and institutions, and the notabilities of Bradford. The Technical College, which formed the headquarters of the Annual Meeting, is described by Mr. Barker North, the Bradford Royal Infirmary by Dr. J. B. Dunlop, the Royal Eye and Ear Hospital by Dr. William Appleyard, the Children's Hospital by Dr. N. G. Meade, the St. Catherine's Home for Cancer and Incurables by Dr. Walter Denby, and the Waddilove Samaritan Hospital for Women by Dr. J. J. Bell. Descriptive notes on places of interest within easy reach of Bradford are provided by Dr. Rowe and Dr. B. Wade, and these are supplemented by a short historical account of Harrogate Spa by Dr. Michael Foster. The history of public service developments in Bradford is told by Mr. Maltby; and the medical officer of health, Dr. J. J. Buchan, in the course of his summary of public health work in the city, describes the origin of the much discussed Municipal General Hospital. The volume closes with a note on Bradford Cathedral from the versatile pen of the editor, with portraits of the Bishop and the Archdeacon.

Ethnological Exhibits.

A series of exhibits of ethnological interest formed part of the museum organized for the Annual Meeting at Bradford under the direction of Mr. F. W. Goyder and Dr. M. A. C. Buckell. A general note on the Pathological Museum appeared in this column last week. The ethnological collection was arranged and exhibited by Dr. J. Hambley Rowe. The principal item was a very representative series of eoliths, paleoliths, and neoliths—the first from the Kent plateau, the second from Belgian gathering grounds and from the Hampshire gravels, and the neoliths chiefly from local sources, though at least five other English counties were represented. Non-flint implements from Arabia, Nigeria, and the United States also were to be seen. These exhibits, placed in chronological order, demonstrated very well the development of craftsmanship from the very crudely worked eoliths to the beautifully finished arrow and lance heads of later neolithic days. As

[1] *The Book of Bradford.* Prepared under the direction of the Publications Committee for the Ninety-Second Annual Meeting of the British Medical Association. July, 1924. Bradford: W. H. Brocklehurst. (Pp. 252; with 106 illustrations.)

one viewed in turn the Pre-Chellean, Strépyan, Chellean, Acheulean, Mousterian, Aurignacean, Solutrean, and Magdalenean sets of instruments, a general decrease in size, an improvement in handicraft, and a greater evidence in design was very noticeable. Curiously, in the Azilian period, which succeeded the Magdalenean (and is looked on as a transitional period between the Paleolithic and Neolithic eras), the implements, though they followed the general diminution in size, were much less ably worked than those of two or three periods preceding them. Apparently the Azilians were a people of inferior culture to the Magdaleneans and Solutreans. The English paleoliths were collected by Dr. Rowe during his period of military service at Bulford on Salisbury Plain, and included several fine and one or two unique specimens. The neoliths included about one hundred arrow and lance heads, knives and scrapers from the moors above Pickering in the North Riding, and a very fine collection mounted on cards and gathered by Mr. Sam Crowther on the local moors. The eoliths mainly came from the collection of the late Benjamin Harrison of Ightham, the learned village grocer, whose contention that they are artefacts found a strenuous believer in Sir Joseph Prestwich, the famous geologist, in 1895, and since then many other geologists and archaeologists have accepted their human origin. On the other hand, a few authorities are not yet convinced. We are indebted to Dr. Rowe for the following brief statement of the reasons given for accepting eoliths as artefacts:

(*a*) The evolution of craftsmanship demands the existence of artefacts of a cruder type than the paleolith.

(*b*) Though the greater part of the surface of eoliths was formed by natural cause, if several specimens of the same general shape are examined and the edge chipping noted, it becomes difficult or impossible to assert that there is no hand-work upon them.

(*c*) The edge chipping is not only alike in general appearance, but is found in similar relative positions.

(*d*) In the "hollow scraper" type the chipping is along the edges of the hollow and not on the projecting corners, which, being more exposed, if nature did the chipping should show the effect of accidental blows.

(*e*) The chipping is generally found on one face of the flint. Accidental chipping would be on both faces.

(*f*) A series of paleoliths and eoliths can be so arranged that it is impossible to draw a line and say that on the one hand there are artefacts and on the other naturally formed stones.

(*g*) There is a distinctive character about the chippings which strikes one as being something different from the irregular breakages of nature.

Other exhibits were a few bones lately exhumed from beneath the tessellated pavement of the "basilica" at the Roman station of Isurium at Aldborough; a cinerary urn (containing fragments of bone), which was dug up on Baildon Moor whilst laying out a golf course; a finely preserved Roman cinerary urn from the Eastern Midlands; a Nigerian skull, with a cephalic index of 82.5; and a few unpublished anthropometrical charts showing seriation of cephalic index in 100 West Riding heads and seriation of stature in 88 Yorkshiremen, drawn up by the exhibitor in 1904.

THE Fellowship of Medicine and Post-Graduate Medical Association announces a fortnight's intensive course, beginning on Monday, August 11th, at the Brompton Hospital for Consumption and Diseases of the Chest. From August 11th to 23rd a course in diseases of children will be given at the Queen's Hospital, Hackney Road, E.2. From August 18th to September 8th there will be a special course, in the diagnosis and treatment of common diseases of the nervous system, at the out-patient department of the West End Hospital for Nervous Diseases, 73, Welbeck Street, W.1. During September the following courses will be held: a fortnight's intensive course in medicine, surgery, and special departments at the Westminster Hospital; on dermatology at the Hospital for Diseases of the Skin, Blackfriars; on diseases of infants at the Infants Hospital; on ophthalmology at the Royal Westminster Ophthalmic Hospital; and on psychological medicine at the Bethlem Royal Hospital. Information about these courses may be had from the Secretary of the Fellowship, 1, Wimpole Street, W.1.

THE HEALTH OF LONDON.

SIR WILLIAM HAMER'S report for 1923, briefly noticed in our issue of July 19th, is full of interesting material, from which it is difficult to make selection.

Influenza.

As an epidemiologist Sir William Hamer has a long and thought-stimulating discussion on influenza. In a diagram of four-weekly periods from 1890 onwards to 1923, the relation is exhibited of average atmospheric temperature to influenza and to diseases of the circulatory system, pneumonia, and bronchitis. The cold of winter is associated with deaths from circulatory diseases, but sometimes the mortality peak is higher than temperature can account for, and the explanation is found in influenza, for an increase in cardiac deaths always occurs during influenza epidemics, which show also a relationship to mortality from pneumonia and bronchitis in cold weather. The behaviour of diseases of the influenza group during 1923 was watched with close attention. Not until the autumn did influenza become strikingly apparent, and the maximum mortality —178 deaths in a week—was not reached until the seventh week of 1924. Then followed an increase in encephalitis lethargica which attained its maximum in the eighteenth week of 1924; and Sir William Hamer goes on to express the view that during the last two years in London "influenza in one or more of its phases has been *endemic*." In discussing this he refers to Hirsch's "Chronological Survey" of influenza, 1173-1875. Hirsch mourns the sparsity of records in this country even for the pandemics of 1857-58 and 1874-75. But for the fifteenth century the sweating sickness has been annexed as influenzal, and also the great dengue prevalences of the eighteenth and nineteenth centuries in India, the West Indies, and elsewhere in the tropics at the identical times when the temperate regions were suffering from "influenzas." Sir William Hamer notes that Dr. Sherman of Los Angeles has quite recently (in the present year) remarked that "in any modern textbook in which dengue is written up, if the reader supplies influenza for dengue the subject matter will not have to be greatly changed," whilst in Calcutta and elsewhere in India prevalence of dengue coincided with recrudescence in London of influenza between July and October, 1923. Having thus roped in dengue, the question of endemicity is raised with regard to the Picardy sweats and "influenza colds," though the subsequent emergence of Pfeiffer's bacillus rather threw such suggestions into the shade. Agues also came into the question, and Bezly Thorne wrote that influenza is "an infectious and febrile affection of the nervous system," which naturally leads on to the lassoing (as at Wembley) of such steers as poliomyelitis, polio-encephalitis, and cerebro-spinal meningitis, to be followed now by encephalitis lethargica, concerning which we are told, "It is being recognized, nowadays, that any phase which may be assumed by influenza is apt to be described as a 'new disease'—men's memories in any case being short, and their eyes being especially blinded at the present time in the dazzling light of so many recent discoveries." Though Hall of Sheffield observed that it was "unfortunate that so much prominence should have been given to a single symptom, which may in some instances be entirely absent," yet, Sir William remarks, the "new epidemic disease" was "duly declared notifiable, and there followed in 1920, 1921, and 1922 a decline in the familiar poliomyelitis, polio-encephalitis, and cerebro-spinal miningitis, a well marked prevalence of encephalitis lethargica becoming officially established in London between 1919 and 1921." We must refrain from additional quotations from the pages on this subject, even though citation is made of the views of recent American writers on encephalitis lethargica, one of whom remarks that "this peculiar malady seems to change its symptoms from year to year," 1919 and 1920 having one group predominating, 1921 another, while in Minnesota in 1923 "there seemed to be an entirely new set of symptoms."

Tuberculosis.

During the three years previous to 1923 the mortality from tuberculosis increased, but in that year there was a decrease greater than in any year since 1910, if the abnormal figures of the war period be disregarded. Attention is called to Dr. Bardswell's investigation of the after-histories of adult tuberculous patients in London who received institutional treatment. Inquiry regarding 2,987 cases supports the impressions of many observers that sanatorium treatment is useful in initial stages, but ineffective when the disease is well established. In 1918 the pulmonary cases were made up of 47 per cent. early, 29 per cent. moderately advanced, and 24 per cent. far advanced. In July, 1923, of these early cases, 85 per cent. were alive, and of the moderately advanced 39.9 per cent., the others of the two groups being dead; while of the far advanced cases only 4.5 per cent. survived. Fortunately the percentage of early cases dealt with was much greater in 1918 than it had been in 1914, but the principle of giving ex-service men the benefit of any doubt has, it is believed, contributed to the good proportion of early cases, and a fall may be expected in subsequent years. It is held that a patient's home environment, housing, work, habits, temperament, and standard of living determine his future much more than his period of sanatorium treatment. A year's sanatorium residence would make more difference, but "even then, in many cases, one would expect bad home conditions to be the decisive factor in ultimate failure." Ex-service men, however, are not limited as to duration of institutional treatment, and have a well endowed scheme of after-care, so that of their "moderately advanced cases" of 1918, 51 per cent. survived in 1923, while of civilian males only 24 per cent., and of civilian females 28 per cent., were still alive.

Typhoid Fever.

Typhoid fever caused only 42 deaths in London in 1923, as against 45 in 1922, 60 in 1921, and 48 in 1920. The cases were, however, rather more numerous (331) than in either of the two previous years. The autumnal prevalence of the disease, formerly usual, has not been observed since 1912. Reference is made to the report for 1922, which contained a review of thirty-two years' typhoid in London, and to the part played in causation of the disease by immature ungutted plaice. The sale of these fish from an area near the mouth of the Elbe and certain other inshore areas practically ceased in London a few years before the war, but reports were received that in the latter part of 1921 and in 1922 it had been resumed. During August and September, 1923, a considerable amount of Danish- and Dutch-caught fish, mostly plaice, was sold in Billingsgate, and subsequently there was an approach to the development of a slight autumnal rise in typhoid.

After discussion of typhoid fever and dysentery in the mental hospitals of London, and of the stages in the history of typhoid in London generally, onwards from 1869, when it was first separately tabulated by the Registrar-General, three conclusions are reached:

"(i) That in the first fifteen years of typhoid fever registration the mortality returns include a large proportion of deaths not really attributable to typhoid fever. Some of the deaths returned from certain institutions, even some years after 1884, probably come within the same categcry.

"(ii) That from 1885-1900, and in less degree for nine or ten years thereafter, typhoid fever, clinically speaking, so far as the large majority of carefully diagnosed cases was concerned, fairly well conformed to type; those affected with it in London throughout the fifteen years in question were mainly quite poor persons; the disease, moreover, exhibited a fairly constant age and sex incidence.

"(iii) From about 1909 onwards the cases of 'typhoid fever' developing in London, apart from persons infected outside London, have in the majority of cases been deemed on further examination not to be typhoid fever."

The report contains an elaborate study of typhoid in the provinces as contrasted with London, and the opinion is expressed that, epidemiologically, London has had two kinds of epidemic disease commonly diagnosed as typhoid. One of these is due to eating polluted fish or shellfish and is unassociated with dysentery; it may occur in explosive outbreaks, but exhibits no tendency to spread from case to case; it shows increase in the autumn, preferentially attacks males from 10 to 25 years of age, and is mainly limited to the working classes (Charles Booth's classes C and D). The other kind is that sometimes met with in mental hospitals; it is associated with dysentery, does not occur in explosive prevalences, shows no marked autumnal increase, but appears to spread from case to case, preferentially attacks females and not infrequently persons over 25, and has no such marked special incidence upon a particular social class. The first type has almost completely disappeared in recent years. From this point of view the subject is then considered decade by decade in the provinces in relation to the industrial areas, whose populations correspond to that in London, which in the past is believed to have received its typhoid through fish or shellfish. The changes in prevalence in the provinces are held to show a general correspondence. The hypothesis is illustrated by a series of maps covering the five successive decades 1871-1920. The whole study, as submitted by Sir William Hamer, is of epidemiological interest and importance.

WELFARE OF THE BLIND.

DEPUTATIONS TO MINISTER OF HEALTH.

A DEPUTATION from the National Union of the Professional and Industrial Blind was received by the Minister of Health on July 28th. The deputation, through Mr. Ben Purse, the general secretary, and himself a blind man, advanced reasons for objecting to the provisions contained in the Blind Persons Act Amending Bill now before Parliament. In the course of his statement he said that the bill, should it become law in its present form, would bring about a complete revolution in present methods of dealing with the needs of the blind community, and would not be productive of good results.

In the first place, Mr. Purse argued, it was neither necessary nor desirable to reduce the pensionable age limit from 50 to 30. It would place difficulties in the way of really effective training being given. Again, there were disabilities even greater than that from which the blind suffered. If the whole question of invalidity was gone into with a view to providing pensions for all such sufferers, then those blind persons who were labouring under additional physical and mental disabilities might properly come within the purview of such provisions; but the deputation questioned whether it was desirable to give a pension to a man at 30 years of age, to provide him with a minimum wage, and to ask the State at the same time to make a grant in aid of the continuity of his employment. This was a trinity of interests which involved their mutual destruction. The present system ensured the co-operation of the voluntary system, municipal help, and State assistance, each performing its own distinctive functions and constituting a guarantee of permanence and stability. It was proposed under Section II of the amending bill to transfer the whole obligation to the county or county borough authorities and to refuse assistance to voluntary agencies. It proposed also to establish the principle of a minimum wage which county or county borough authorities would be required to provide. The blind themselves considered that with the present machinery they could obtain infinitely better results and provide more substantially for the needs of the blind, whilst at the same time increasing the number of employable blind. To sacrifice existing arrangements by setting up some newly devised machinery was to suggest a scheme that could only be conceived in institutions reserved for a particular type of mental case. The productive capacity of the average blind worker was not more than 50 per cent. of that of the normal artisan engaged in the same occupations, and when county and county borough authorities realized this they would naturally be reluctant to speed up methods of training when they knew that the economic value of those workers for whom such training was necessary would not be comparable with the monetary values they would be required to provide. The deputation deliberately and emphatically affirmed that such a provision could only result in reducing the number of employable blind persons. Difficulties would arise if a municipality were called upon to launch out in general trade and subsidize such trade from funds derived partly from the State and partly from the funds of local

authorities. It was held that there were directions not indicated by the amending bill in which the Blind Persons Act, 1920, could be strengthened. First, the powers of municipalities should be enlarged in order that they might be in a position to take effective necessary measures to check preventable forms of blindness; and, secondly, Section II of the Act should be so amended and strengthened as to deal directly with the problem of mendicancy among the blind. Section III might be so amended as to provide that the registration authorities should periodically, say every three years, be required to satisfy themselves that none of the societies registered in their area have become redundant.

Another deputation—this time from the National League of the Blind—waited on the Minister of Health on July 31st to urge acceptance of the bill now before Parliament. The deputation pressed for the abolition of the voluntary system in connexion with the welfare of the blind and the establishment of direct municipal and State control, urging that the wages of blind workers should be not less than those paid to the unskilled municipal labourer. They asked also that competent blind persons should have preference over seeing persons in the appointment of home teachers. Mr. Wheatley thanked the deputation for their statement of their case. He pointed out that he had already received two other deputations on this matter during the week, and promised to give most careful attention to the whole question at an early date.

England and Wales.

FEES TO MEDICAL OFFICERS AT CORONERS' INQUESTS.

THE Coroners Act, 1887, provides that a medical practitioner who has attended at a coroner's inquest in obedience to a summons from the coroner shall be entitled to receive two guineas for making a *post-mortem* examination of the deceased and for giving evidence thereon, or one guinea for giving evidence in cases where no such examination has been made. As is well known, however, there is a proviso to the effect that when the inquest is on the body of a person who has died in a public institution of a kind specified in the Act, the medical officer of that institution whose duty it has been to attend the deceased person is not entitled to receive a fee. Hitherto considerable difficulty has been experienced in determining what institutions were excepted from this provision, but fees have not been withheld from medical officers of workhouses and Poor Law institutions. Recently the district auditor of the London County Council took exception to witness fees paid to medical officers of hospitals controlled by the Metropolitan Asylums Board, and he has now drawn the attention of the Council to the fact that although eminent counsel advised many years ago that Poor Law infirmaries were not public hospitals within the meaning of the Act, these institutions have now considerably changed their character. Advantage is frequently taken of these institutions by patients who are not destitute in the sense that they cannot pay for medical assistance, and patients are sent to them from the general hospitals. The auditor concludes that the fees provided to be paid under the Coroners Act for making *post-mortem* examinations and giving evidence at inquests are not payable to the medical officers of hospitals controlled by the Metropolitan Asylums Board, Poor Law infirmaries, general infirmaries, prisons, and other medical institutions of a public character, and that such payments, if made, are an illegal and improper charge upon the Council's funds. The Public Control Committee accordingly recommended to the London County Council that such payments be discontinued as from September 1st next, and the Council, at its meeting on July 29th, adopted the recommendation. The amount of fees involved is stated to be about £1,500 a year.

THE CARE OF CRIPPLES IN WALES.

Last week we had occasion to mention the recent rapid extension of an organization for the care and treatment of cripples which had its origin at Baschurch in Shropshire, where was established a cripples' home now transferred to a larger building at Oswestry, which is near the Welsh border. We now have to record fresh evidence that the same movement is developing in Wales. The Prince of Wales Hospital at Cardiff owes its existence to Sir John Lynn-Thomas, who, when consulting surgeon to the Western Command during the war, was able to interest Mr. Percy Miles and the late Mr. J. P. Cadogan in the establishment of an orthopaedic hospital for the treatment of Welsh soldiers crippled in the war. From the first the idea was that after the war the hospital should become a civilian institution, and that has already come about; but the accommodation has proved insufficient and the hospital has a waiting list of 260. As a step towards relieving the congestion, ten open-air cots have been provided in the garden of the hospital, and these were formally opened by Dame Margaret Lloyd George last week. At the beginning of the proceedings the chairman, Mr. Percy Miles, read a telegram from the patron of the hospital, the Prince of Wales—who had opened it about seven years ago—in which he expressed the hope that the necessary funds would be given to provide further accommodation urgently required. Sir John Lynn-Thomas sketched the history of the hospital, which, he said, had just entered upon a new phase of its career. A skilled staff with all the necessary equipment was now engaged in carrying on orthopaedic treatment for the maimed and cripped in Wales. He dwelt on the importance of beginning treatment early, as in this way there was a better hope of restoring to health and active life children who would otherwise be lifelong burdens to themselves and their friends. The provision of a country branch would not only help to relieve the pressure but would add greatly to the efficiency of the hospital. Mrs. Lloyd George supported this view, and Mr. Alwyn Smith, one of the surgeons of the hospital, said that a country hospital containing at least one hundred beds was needed. A site had not yet been selected, but it was estimated that about £20,000 would be required. A vote of thanks to Mrs. Lloyd George was adopted by acclamation, and in the course of her reply she read a message of goodwill from Sir Robert Jones. On the motion of Sir William Diamond, seconded by Professor A. W. Sheen, F.R.C.S., a vote of thanks was adopted to the chairman, of whose devoted services to the hospital both spoke in the highest terms.

BRISTOL CRIPPLED CHILDREN'S SOCIETY.

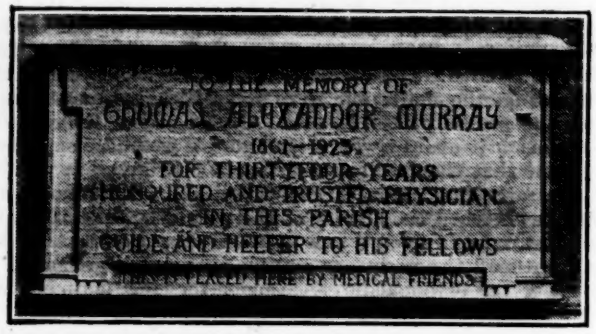
The first annual report of the Bristol Crippled Children's Society contains a record of the success that has been achieved in correlating the various agencies in Bristol which deal with crippled children, the supply of surgical appliances, the provision of convalescent treatment, and skilled supervision in the homes. During the past year 150 cases were dealt with; 36 children were enabled to receive treatment at local hospitals, 56 were provided with surgical appliances, 21 were given extra nourishment, 19 were sent to open-air hospital schools and other special hospitals, and 7 to convalescent homes.

CARDIFF ROYAL INFIRMARY.

The Royal Charter authorizing the King Edward VII Hospital, Cardiff, to be known as the Cardiff Royal Infirmary has been granted. The eighty-seventh annual report, which has lately been issued, deals with the considerable progress made during the year in the reorganization of the infirmary to meet the requirements of the medical school of the University of Wales. The requisite minimum number of medical beds has been provided for the unit system. In addition to a slight increase in income the infirmary gains the services of whole-time medical officers of professorial rank, who receive stipends from the university. The services of the staff of each unit are given without charge, and the laboratories and fully equipped departments are also placed at the disposal of the infirmary. During the last year 4,652 in-patients and 23,476 out-patients were treated, and 4,619 operations were performed. Each department in the infirmary was taxed to the utmost, but there are still over 1,000 on the waiting list. The average daily number of patients in the infirmary during the past year was 282.6, as compared with 282.37 in the previous year, and the average cost of each occupied bed dropped from £151 2s. 2d. in 1922 to £146 0s. 9d. in 1923.

MEMORIAL TO DR. T. A. MURRAY.

An interesting ceremony at the Great Sankey Parish Church on Sunday, July 13th, was the fulfilment of a desire among general practitioners in the district that the valuable work of the late Dr. T. A. Murray of Penketh should receive recognition in some concrete form. He was for fifteen years an ideal honorary secretary of the Warrington Division, and he never spared himself in his efforts to further the interests of the British Medical



Association. He possessed a strong, tactful, and genial personality, which was highly regarded both by his colleagues near home and at headquarters.

A carved oak tablet to his memory in the church was unveiled in the presence of a large assembly of old patients and friends, local medical practitioners, and the President of the Lancashire and Cheshire Branch, Dr. W. H. Bateman of Rochdale.

Ireland.

MEDICO-PSYCHOLOGICAL ASSOCIATION.

AT the annual meeting in Belfast of the Medico-Psychological Association of Great Britain and Ireland (to which reference was made in this column on July 19th), Dr. G. M. Robertson read a paper in which he suggested that dementia praecox ought not to be considered a definite clinical entity as suggested originally by Professor Kraepelin. Several varieties of mental disorder were possibly included under this term, all of which tended to develop one or another of the nine different forms of terminal dementia described by Kraepelin. Sir Frederick Mott gave an account of his recent work on the thyroid gland, and emphasized the importance of the thyroid and the endocrine glands generally in relation to mental disorder. He drew attention to the part played by the cholesterin ester of the suprarenal in neutralizing the toxins of infections as well as building up the body tissues. Dr. R. Marshall contributed some notes on encephalitis lethargica, based on forty-two cases treated in the Royal Victoria Hospital, Belfast, between 1918 and 1923. There seemed to be no definite relationship between the intensity of the attack and the development of a Parkinsonian syndrome. Dr. Chalmers Watson dealt with the part played by autoinfection in the etiology of acute and chronic mental disorders viewed from the standpoint of the general physician, and Dr. A. T. Hobbs of Toronto gave a survey of the American and Canadian psychiatrists' opinion regarding the importance of focal infection or chronic sepsis in functional psychoses. Among other subjects considered was the colloidal gold reaction of the cerebro-spinal fluid, introduced by Dr. T. Houston, and Dr. W. Calwell reported a case of mental symptoms following the evacuation of a cerebral blood cyst, and read a short paper embodying a new suggestion with regard to the conception of the "unconscious." He suggested that there might be a primitive mind, not self-conscious, with a physical basis in the primitive brain, giving rise to the phenomena of the unconscious, but inextricably associated with the adult human mind, which had its physical basis in the later developed association centres.

SIR PATRICK DUN'S HOSPITAL.

The movement in aid of the rebuilding of Sir Patrick Dun's Hospital, which has set itself out to raise in Dublin and vicinity a sum of £100,000 during the period July 31st to August 9th, was advocated at a dinner in the Mansion House on July 31st, at which a very large company assembled, comprising members of the medical and surgical professions and other prominent people. Sir William Taylor, M.D., said that remodelling the hospital would be throwing away money, and the Board had come to the conclusion that it would be better to scrap the hospital and build one that would be in keeping with modern requirements. That was why they were out in the present campaign. Objections had been raised to rebuilding the hospital and spending so much money when the public recognized that amalgamation of hospitals would be more in keeping with modern ideas. There were many advantages to be gained from amalgamation. He believed they could build a hospital with 750 beds, fully equipped and carry on at no greater expense than five of the hospitals with 650. So far as the campaign for the rebuilding of Sir Patrick Dun's Hospital was concerned, he said that they would not spend a penny on the rebuilding until every avenue in connexion with amalgamation was explored.

ARMAGH ASYLUM.

At a recent meeting of the Committee of Management of Armagh Asylum, the resident medical superintendent presented his annual report. The statistical report, which dealt with the year 1923, stated that on December 31st there were 253 males and 250 females in the institution, a decrease of 11 on the previous year. During the year 11 were admitted, an increase of 6; but 2 of these were considered not to be insane and were discharged as soon as possible. The total number of cases under treatment was 592, 66 of which were first admissions, being 3 less than the previous year; 38 were discharged, 22 as recovered, and 11 as relieved; 1 was not improved, but was considered to be sufficiently harmless to be allowed out under the care of his relatives. There were in all 29 deaths, including 12 of persons over 60; all were due to natural causes. There was one death from influenza in 1923, though in the early part of the present year there were a good number of deaths from this disease, which was more or less epidemic in the neighbourhood. It is a matter for thankfulness that no deaths occurred from violence, accident, or suicide. One patient effected her escape.

New South Wales.

SYDNEY MEDICAL SCHOOL.

AT the recent commemoration ceremony of the University of Sydney Dr. John Hunter, professor of anatomy, was admitted to the degree of Doctor of Medicine with first-class honours and the University medal, and was awarded the Ethel Talbot Memorial Prize. His thesis was "The forebrain of *Apterya australis*." The Peter Bancroft Prize for the year 1923 was awarded to Dr. N. D. Royle for his experimental work on the problem of the treatment of spastic paralysis.

AMERICAN SURGEONS IN SYDNEY.

During March, Sydney was visited by members of the American College of Surgeons. The party included Drs. Franklin Martin, W. J. Mayo, Hart, and R. Smith. They were entertained at various functions. A luncheon was given by Sir George Fuller, Premier of the State of New South Wales. A dinner was given by members of the New South Wales Branch of the British Medical Association. Addresses were given by the visitors on the standardization of hospitals, and Dr. Mayo delivered an address to the Medical Society of the University of Sydney on research work. Consequent on their visit, it is understood that Dr. Ralph Worrall, formerly senior gynaecological surgeon of the Sydney Hospital, has been asked to visit the United States at the time of the next annual congress of the

American College of Surgeons, when the honorary degree of Fellow of the American College of Surgeons will be bestowed on him. Professor John Hunter and Dr. N. Royle, who have been recently occupied in research work on the function of the nervous system in regard to the locomotor system, have been invited to deliver the John B. Murphy address at the same congress.

SIR ALEXANDER MACCORMICK.

Sir Alexander MacCormick, for many years lecturer on surgery, has left for a six months' trip to England, and before his departure was presented with an oil portrait of himself, the subscribers to which consisted of medical men on whom, or in whose families, he had at some time operated. It is expected that this portrait will later be hung in the Listerian Theatre at the Sydney University.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

Maternity and Child Welfare, India.—The Under-Secretary of State for India informed Mr. Scurr, on July 28th, that the Government of India did not intend to ratify the proposals of the International Labour Convention of Washington concerning maternity benefits. The Washington Conference of 1919 had asked the Indian Government to make a study of the question of the employment of women before and after confinement, and of maternity matters, and had made a report on the subject. In reply to a further question as to the mortality rate of infants and children, statistics were given, not in the usual form—namely, deaths of infants in relation to births—but as the ratio of deaths per 1,000 of population in the Bombay Presidency. The following figures show the ratio of deaths per 1,000 of population of infants under 1 year, and between 1 and 5 years of age, in the Bombay Presidency, for the years 1919 and 1920. For 1919: Infants under 1 year—males 206.70, females 196.73; 1 year and under 5—males 56.48, females 55.32. For 1920: Infants under 1 year—males 191.42, females 174.26; 1 year and under 5—males 45.60, females 43.20. Mr. Richards states that he has seen the report of the lady doctor appointed by the Government of Bombay to the effect that 98 per cent. of the children born in the industrial area in Bombay are drugged with opium. He is inquiring into the matter.

Methylated Spirit: Denaturant.—Mr. Lorimer inquired, on July 30th, the number of persons convicted of methylated spirit drinking since the addition of pyridine was made compulsory, and how these figures compared with the number of convictions before the issue of the new order. The Under-Secretary for the Home Office (Mr. Rhys Davies) said it would not be possible to measure results yet as the ingredient was not introduced compulsorily until May 1st of this year. Mr. Lorimer asked whether the Minister was aware that the Chairman of the Liverpool Licensing Bench said that the increase in the consumption of methylated spirit was enormous, and in those circumstances would not the Home Office withdraw the order for the mixture, which was very injurious to the industries using methylated spirit. Mr. Davies replied that they were very desirous of making methylated spirit as unpalatable as possible to those who were inclined to drink it. Mr. Lorimer put it that as methylated spirit was extensively used in surgery, and was one of the best sterilizers of the skin and of instruments, the Chancellor of the Exchequer should, in the interests of surgeons and patients, cancel the order for the addition of pyridine, inasmuch as it had a harmful effect upon the skin of the hands of surgeons and the skin of patients. Mr. Graham said that the question was then under investigation.

Patent Medicines.—Sir A. Butt asked, on July 30th, whether, having regard to the deception, and often injury to health, inflicted upon poor people by advertisers of patent medicines, who alleged that they were capable of curing malignant diseases, the Minister of Health would introduce a bill making it obligatory that all patent medicines should state clearly on the labels the principal drugs they contain. Mr. Wheatley referred the hon. member to a reply given to Sir Kingsley Wood stating that the Government could not find time for the introduction of legislation this session.

Birth Control.—Mr. Thurtle suggested to the Minister of Health, on July 30th, the desirability of allowing local authorities to impart to people who wished to obtain it information as to birth control methods, without penalizing such local authorities by withdrawing their maternity and child welfare grants. Mr. Wheatley replied that his view was that the institutions provided by local authorities at the cost of public funds should not be used for purposes such as that contained in the question, which were the subject of controversy, without an express direction from Parliament. Mr. Thurtle asked whether the Minister knew that a large number of Labour women passed unanimously a resolution in favour of this procedure. Miss Jewson also inquired whether the Minister was aware that many working-class women attending welfare centres were unfit to bear children and to bring up healthy children; and the doctors knew they were unfit and yet were unable to give the information which any upper- or middle-class woman could obtain from a private doctor. She asked the Minister to consider the bearing of this question on the subject of abortion, which was so terribly increasing in this country. Mr. Wheatley submitted that these suggestions and arguments might be put before Parliament if it were considering new directions, but he held that his business was only to carry out the instructions received.

Royal Commission on National Health Insurance.—Mr. Wheatley stated, on July 31st, that the Royal Commission on National Health Insurance had already held a preliminary meeting and would begin its sittings for the hearing of evidence in October. The Commission had not yet reached a decision as to the admission of the public to its meetings.

National Insurance Age Limit.—Mr. Black pressed the Minister of Health, on July 30th, as to the exclusion of persons at the age of 70 from further participation in benefits, however long they had contributed to the funds. Mr. Wheatley, in his answer, pointed out that though liability to pay contributions and the title to sickness and disablement benefits ceased at the age of 70, medical benefit did not. The extension of sickness and disablement benefits to persons over 70, which could be effected only by amending legislation, would necessitate an increase in weekly contributions. It would also present serious administrative difficulties to approved societies in the application of the test of incapacity for work.

Departmental Committee on Sexual Offences.—The Home Secretary has appointed a Departmental Committee under the chairmanship of Sir Ryland Adkins, K.C., with the following terms of reference: "To collect information and to take evidence as to the prevalence of sexual offences against young persons and to report upon the subject, indicating any direction in which in their opinion the law or its administration might be improved." The other members of the committee are: Mr. H. W. Disney, Miss E. H. Kelly, C.B.E., J.P., Miss Clara Martineau, J.P., Dr. A. H. Norris, M.C., Mr. R. J. Parr, O.B.E., Mrs. Rackham, J.P., and Sir Guy Stephenson, C.B. The secretary is Miss J. D. I. Wall of the Home Office.

Coroners' Inquests.—Mr. R. Richardson asked, on July 31st, if the Home Secretary would initiate legislation to secure the better conduct of *post-mortem* examinations; to prevent the nomination to appointment of coroner by private individuals; to bring the office more into accord with modern needs; and to arrange that inquests should be adjourned until after trials at assizes with a view to avoiding unnecessary expense and the inconvenience and hardship to witnesses giving evidence before these tribunals. Mr. Davis said that the Home Secretary now had under consideration a draft bill for amending the law relating to coroners and coroners' inquests, and that this bill dealt with the points to which Mr. Richardson referred.

Income Tax Relief for Professional Workers.—Major Church inquired, on July 31st, if the Chancellor of the Exchequer was aware that salaried, professional, scientific, and technical workers assessed for income tax purposes under Schedule E were at a disadvantage as compared with corresponding classes assessed under Schedule D as regards abatements on account of subscriptions to learned societies and libraries, the cost of the preparation of scientific memories, the upkeep of private laboratories, the provision of study accommodation, and the provision of special clothing; and whether, in view of certain abatements to the journalistic profession, he would give similar relief to the above-mentioned classes. Mr. Graham replied he was unaware that the classes mentioned were at a disadvantage. Questions in regard to the admissibility of expenses under Schedule D and E of the Income Tax Acts were necessarily dealt with in accordance with the existing law; the allowance of particular items of expenditure could be determined only by reference to all the facts of the case. If Major Church had in mind any case in which further relief was thought to be due to a taxpayer, and would let him (Mr. Graham) have the necessary details, he would have the matter investigated.

Sanitary Commissioner in India.—Questioned by Mr. Hogge, on July 28th, Mr. Richards said that Lieut.-Colonel Graham, I.M.S., who was appointed by the Government of India to act during the absence of the Public Health Commissioner on leave, was not registered as holding the D.P.H. He held the degrees of M.B., M.S.Glas., and the Diploma of Tropical Medicine. During the war he was A.D.M.S. (sanitary) at General Headquarters, Mesopotamia, and since the war had held the post of Director of Health Services and adviser to the Minister of Health, Irak Government.

Service Treatment Allowances.—Dr. Haden Guest inquired, on July 28th, whether, seeing that under the rule of the Pensions Ministry a man suffering from an attributable disability which disabled him from work was not entitled to treatment allowances unless the treatment prescribed by the Ministry was of such a character as actually to prevent him from obtaining work, and in view of the fact that a man certified by his panel doctor, or by a hospital doctor, to be incapable of work, was thereby rendered unable to obtain work while at the same time he did not receive any treatment allowances, the Minister of Pensions would take steps to remove what appeared to be a grave hardship to ex-service men. Mr. Muir reminded Dr. Haden Guest that the conditions governing the grant of allowances under Article 6 of the Warrant were not identical with those which determined certification for the purpose of sickness benefit under the National Health Insurance Act. Allowances under the Warrant were not, therefore, necessarily also payable in all cases, because sickness benefit was obtained. He regretted that the Pensions Minister was not in a position to accept the suggestion made.

Notes in Brief.

Marriage allowance is granted in India to personnel of the British service and to certain other ranks drawn from the British service and serving under the same general conditions of pay. It is not considered necessary to extend the allowance to the Indian Medical Department, the personnel of which with few exceptions are domiciled in India. They are allowed to draw separation allowance on account of special war-time conditions.

Correspondence.

CRIMINAL RESPONSIBILITY.

SIR,—In the summary of recommendations of the Report of Lord Justice Atkin's Committee on Insanity and Crime, the first clause reads: "It should be recognized that a person charged criminally with an offence is not responsible for his act when the act is committed under an impulse which the prisoner was by mental disease in substance deprived of any power to resist."

The second clause reads, "Save as above, the rules in M'Naghten's case should be maintained"—that is, the test of the knowledge of right from wrong is maintained.

The report therefore indicates two tests of irresponsibility: (1) uncontrollable impulse from disease; (2) absence of knowledge of right from wrong. The first is purely psychological, the second intellectual and ethical.

The first can be proved to be present in every case, and the second only in a very few. An "act," as psychology (the science of common sense) asserts, and all men know, is due to impulse. Every "criminal act" is due to impulse, and when committed by an insane person the presumption is that it is due to disease, unless there is evidence to prove a criminal motive unrelated to the insanity, or that the impulse from disease was not of a form or degree to render it uncontrollable.

There is no definition possible of insanity as a whole or even of its groups, and different forms of impulse may arise in the same conditions of disease. Hence the existence of morbid impulse and its uncontrollability can be decided best on the evidential facts in each case.

The M'Naghten "test" is open to many objections, namely:

That the vast majority of the insane in asylums obey the rules, etc., of the institution, and that a large proportion have a keen appreciation of their ethical relations to others.

That in certificates of insanity and in notes of their malady no mention of the knowledge of right from wrong is ever made.

That insane persons accused of crime are of adult age and have usually lived with little or no breach of social order, so that unless they have become extremely demented they must still retain their social knowledge.

The measures taken in secretly preparing for the commission of the crime and for the evasion of detection before and after it are evidence of knowledge of wrong in a large proportion of cases.

The fact that lunatics have been known to express the knowledge of their irresponsibility.

The statistical examination of the results of murder trials shows that many are condemned under this test and are reprieved afterwards on the ground of insanity.

That many escape condemnation because the judges evade applying the test.

That with few exceptions the criminal insane in Broadmoor, under the strict application of the Act, should have been executed.

That juries as a rule are not educated to decide the debatable questions in jurisprudence and ethical philosophy that may arise under the M'Naghten test.

That every juryman has had personal experience of a great number of impulses to wrong acts and can the more readily understand impulsive action.

A full knowledge and consideration of these facts would, I believe, convince legal authorities that there are very few insane persons to whom the test would apply, except the mental defectives, the demented, and those in states of incomplete consciousness, whose mental irresponsibility is obvious.

The question of the capability of an insane person to control an impulse on which he has been proved to have acted would probably be decided on the impulse being related to the form of insanity—for example, suicide to melancholia, vindictiveness to persecutory insanity, etc., together with evidence of it having been manifested in other acts. Also in the absence of any sane motive or of previous criminal habit or character.

The responsibility of an insane person, however difficult the proof may be, should certainly be held to be possible, for reasons of a deterrent nature, both in the incipient and certified insane.

From these considerations it is to be hoped that the so-called M'Naghten "test" will be dropped as unsatisfactory and misleading, and that the first clause of the summary of the report will become the psychological and sole test of irresponsibility.—I am, etc.,

London, N.W., July 15th. H. RAYNER, M.D.

THE ADMINISTRATION OF PLAGUE VACCINE.

SIR,—I am reminded by the letter of Dr. Mansoor (BRITISH MEDICAL JOURNAL, July 12th, p. 83) of an experience in Basra, Mesopotamia, when in 1919 an outbreak of plague occurred in that town and surrounding districts. I have no figures beside me, but the salient points stand out clearly in my memory.

The outbreak began in April and was exhausted by the end of June, only an occasional case appearing early in July. Some three hundred or more cases were reported, and the measures adopted were disinfection of dwellings, etc., and the inoculation of occupants and neighbours. An attempt was made to popularize inoculation among the natives by issuing pamphlets and communicating articles to the local press on the advantages of inoculation. In this work, too, the services of health visitors—Indian, Hebrew, and Armenian alike—were invaluable. Four thousand or more natives were inoculated at dispensaries established for the purpose, but it was soon found that very few women presented themselves unless of the Jewish or Armenian section of the community; purdah women refrained. Accordingly a dispensary for purdah women was set up and staffed by two nursing sisters, where, as far as I can remember, 1,200 or more women were inoculated.

It was thought advisable to give the full dose of vaccine at one attendance, as it was highly improbable that the natives would return for a second injection had the dose been divided. I have therefore no knowledge of the severity of the reaction following inoculation in these people, but among the European, Indian, and Arab staff it was seldom that the reaction could be described as severe, few, in fact, having to cease work. Generally, the reaction was no worse than that following the first T.A.B. injection.

The result of this work left no doubt in my mind of the value of plague vaccine as a prophylactic measure. Of the people inoculated only a small percentage subsequently developed plague, and these had either been incubating the infection at the time of inoculation or had been infected during the negative phase following the injection. A notable feature was the comparative immunity of inoculated individuals who continued to live in infected dwellings and the tendency of uninoculated members of the same houses to contract the disease.—I am, etc.,

J. W. PATTERSON, M.B.,
Late Captain R.A.M.C.

Glasgow, July 21st.

CARDIAC DELIRIUM.

SIR,—In your Epitome of June 7th last, under the heading of "Delirium in heart disease," Dr. R. Massini is quoted as describing two types of mental aberration occurring in individuals suffering from heart disease. In your issue of June 28th Sir Clifford Allbutt, in discussing these types, refers to the condition as cardiac delirium, and it is from this use of this name that I would humbly dissent. The terms "cardiac delirium" and "delirium cordis" are surely synonymous, and yet the latter has usually been employed to denote, not a mental state, but a confused and excited condition of the heart muscle, usually due to auricular fibrillation. It is always a pity when a phrase signifies two quite different things. Thus, one often sees the doubt that arises when the term "sleeping sickness" is used. It may mean either encephalitis lethargica or trypanosomiasis; and if he received a cable from the other side of the world saying that a friend had "sleeping sickness" he would not know exactly what was wrong. In the same way, if the cable read "cardiac delirium" the loved one might either be mentally unbalanced or in cardiac distress.

Apologizing for thus even seeming to criticize the language of such a master of English as Sir Clifford Allbutt, I am, etc.,

Toronto, July 18th. R. D. RUDOLF.

SIR,—I think evidence could be easily collected from general practitioners that this is anything but an uncommon condition. Undoubtedly it only occurs when a patient is gravely ill, but few of us would care to say that the patient would not recover. Without going further back than the last twelve months, I can remember two patients who

recovered after it, both of whom are living to-day. One, an old lady, has had two attacks of heart failure, both accompanied by "travelling delirium"; the other is a man who is again active and walks easily two or three miles a day.—I am, etc.,

Spalding, July 27th. RAMSAY MUNRO.

SIR,—It may be of interest to record a case of "travelling delirium" which has been very marked. A male patient, 68 years old, had suffered for some four years with myocarditis and had had several attacks of cardiac failure. During his last illness, of seven weeks' duration, the symptom of "travelling delirium" was very noticeable and persistent, lasting for a fortnight, in fact until his death a week ago.—I am, etc.,

Chester, July 26th. JOHN WELSH.

THE R.A.M.C.(T.A.).

SIR,—Though now retired, I should like to say a few words on this important subject, based on a long experience as D.A.D.M.S. and A.D.M.S. of a Territorial division.

The shortage of medical officers was a source of anxiety before the war, but seems to have become even more acute since. This is, of course, partly due to "war weariness" and partly to a recollection of the rapidity with which many temporary medical officers (who had undergone none of the burden of peace-time training) skipped up the ladder of promotion, passing at a bound over the heads of Territorial Force officers who had years of service behind them. Medical men now naturally think that it will be better to wait and join up when the next war comes along, and certainly the attenuated cadres to which the present R.A.M.C.(T.A.) is reduced point the same moral.

Now this idea is exceedingly subversive of the efficiency of the Territorial Army. Granting that we can perhaps allow 75 per cent. of the officers in a general hospital, 50 per cent. in a casualty clearing station, and, say, 25 per cent. in a field ambulance, to be men with medical training only, still the remainder must be trained soldiers as well as doctors, or the units in question will be immobilized and useless. As each existing field ambulance must on mobilization at once expand into three, it is obviously necessary and imperative that in peace time it should have its full number of officers training for that eventuality, and the same applies to other units.

The need, therefore, is urgent. How are the officers to be obtained?

First, I think, a very grave mistake is made in belittling the work to be done in the A.M.S.(T.A.), and representing it as a pleasant picnic. The right sort of men are not got that way; in fact, it is probably the reason why so few of the right sort do join up. Men are not going to put themselves to serious inconvenience for a trifle, and though undoubtedly to the man with soldierly instinct and true patriotism the work brings very great pleasure, it is also at times hard and exacting: examinations have to be read for and passed, evenings given up to drills and lectures, and even camp is not a real holiday, because the medical man does not get away from his professional work there as all others do. I think it would be far better to stress the work and the urgent necessity for it, and not to present it as a pleasant relaxation. The pay will perhaps cover expenses, but not much more. The attraction should be the wider outlook gained and the opportunities for acquiring professional knowledge; and here I think the authorities might step in and throw open the courses of instruction in the R.A.M.C. College at Millbank to a certain number of Territorial medical officers each year. The opportunity of becoming really efficient in sanitary science, tropical medicine, etc., would be a very strong inducement to men to join up. In addition, special facilities might be given to suitable candidates from the Territorial Army to join the R.A.M.C., on the lines of those given in the combatant ranks of the Territorial Army for commissions in the line. Such facilities are no more than the service deserves, and would be a well merited recognition of the public spirit of the R.A.M.C.T. officers. Inducements such as these would, I believe, bring in desirable men. At present riding, camp sanitation, and stretcher drill are the only avenues by which fresh experience can be obtained.

Personally, I have always held very strongly that every medical officer should join, or be attached to, a field ambulance in the first instance before taking up regimental duty. Otherwise he never has an opportunity of really learning his work and his duties, but remains "the Doc.," very much at the mercy of the adjutant and the sergeant-major, which is not desirable. Such a course also promotes a spirit of camaraderie between the regimental and other medical officers, which is most useful and desirable on active service.—I am, etc.,

E. C. FREEMAN, Colonel A.M.S.T.(ret.),
Late R.A.M.C.

Bury St. Edmunds, July 22nd.

SIR,—One cannot but sympathize with Colonel Ducat's lament over the shortage of medical officers, but his assertions that those who join "will never regret it," and that their years of seniority "will benefit them in no small degree," are not borne out by the facts of the late war.

A medical officer to a combatant unit will serve for three and a half years and pass an examination before becoming a captain. He will go to the war (if any) with his unit, live in the trenches—possibly for years—and come home a casualty. On leaving hospital and reporting for duty, as a tried and seasoned veteran he will, of course, be given an appointment at home or abroad with higher rank and pay? Not a bit of it. He will find himself odd man out in a medical unit where he is years senior to everybody, including the O.C., and with less pay than the latest imported conscript (who, by the way, is automatically promoted in the abbreviated space of twelve months, while he himself is not allowed a day's reduction in his period of service). If he is stationed at home his allowances are cut off, and he will beg to be sent abroad again in order to earn nearly as much as a conscript on home service. He is fortunate if he gets back to the mud and blood of his old congenial battalion; and he will finish the war, as he began, a captain.

My advice to a young man about to join is: "Don't. Wait until you are conscripted, and then you will get more consideration, better pay, quicker promotion, and earlier demobilization."—I am, etc.,

July 14th. "MORE THAN ONCE BITTEN."

THYROID EXTRACT AND MANGANESE.

SIR,—Dr. H. W. Nott, in his letter printed in the JOURNAL of July 12th (p. 81), should have given your readers exact details of the administration of thyroid gland and permanganate of potash. Does he administer them in actual combination or separately, and at what intervals of time? Dr. William Moore gave a demonstration at a banquet of medical men thirty years ago that potassium permanganate was an antidote to morphine; he did this by taking three grains of morphine followed by four grains of potassium permanganate in weak solution. Nearly a hundred people were saved that year in New York alone by that demonstration.

I introduced acid permanganate as a means of estimating morphine and its salts, also uric acid and its salts, so early as 1877, and published the same (see *Year Book of Pharmacy*, 1878); and permanganate was recommended by me as an antidote to morphine and opium in 1884. But I could never feel sure that Dr. W. Moore's method of giving permanganate hypodermically, as well as by mouth, could be effective, because acid permanganate was also my method for estimating all the albumins (eight parts albuminoid decolorize one part of permanganate *immediately* in weak acid solution), vegetable and animal, quantitatively. Albuminous principles are all easily oxidizable and immediately deoxidize permanganates. A 5-grain tabloid of thyroid might be expected to deoxidize more than a sixteenth of a grain of potassium permanganate. If Dr. Nott and his confreres combine the remedies in pill form, or if Dr. W. Moore's hypodermic method is effective for morphine poisoning, then it should be a reduced salt of manganese that would answer both purposes, and a preparation of manganese might be found more palatable than permanganate itself (see *Pharm. Codex*).

A patient of mine found by accident more than twenty years ago that potassium permanganate, taken in quarter-grain doses in plenty of water in the early morning, cured his chronic rheumatism and reduced his bunions; instead of being unable to walk two miles he could walk fifteen. He has continued his daily dose more than twenty years, and would not give it up, except whilst I was attending him. He started quite a coterie of permanganate takers in his neighbourhood, and I know a family who regard it as a specific for gout. He is 78 years old and more active than he was at 50.

The alkaloids which do not deoxidize permanganates, which are therefore unlike morphine, apomorphine, and colchicine, and which we may call for the moment non-oxidizables, are: caffeine, strychnine, hyoscine, atropine, hyoscyamine, and aconitine, as I demonstrated by *in vitro* experiments, published 1894-96 in a series of articles.—I am, etc.,

London, S.E.24, July 21st. J. Barker Smith, L.R.C.P.

SMALL-POX IN LONDON.

Sir,—Dr. Archibald Kidd (British Medical Journal, July 26th, p. 161) draws attention to the recent outbreak of small-pox in London, and says that it forms an instructive commentary on one of my arguments. That argument is that very mild cases of small-pox in the unvaccinated, such as are easily overlooked, are of very rare occurrence when we are dealing with a virulent strain of small-pox; that such cases usually occur only when we are dealing with a very mild strain of small-pox, and that such strains tend to breed true.

If such a case as the clinically very mild attack in an unvaccinated child which apparently was responsible for the recent London outbreak (where the strain was clearly a highly virulent one) were a common occurrence, I admit that it would to a large extent invalidate my argument; but I submit that it is so rare as to be almost unique. I have never alleged that such a thing could not occur, but I have urged, and I still urge, that it is infinitely less likely—when we are dealing with a severe strain of small-pox—for ultra-mild modified cases (such as easily escape recognition) to occur in unvaccinated subjects than in vaccinated ones.

I assume, as I am bound to do, that there is no doubt that the unvaccinated child responsible for the recent outbreak really was "extremely mild," as stated by Dr. Kidd; also that it really was unvaccinated. The mere fact that a case of small-pox has no marks on the arms and is stated by the parents to be unvaccinated, whilst it justifies such a case being classified as unvaccinated, does not necessarily exclude the possibility of the case having been vaccinated. I well remember a patient (a young woman) who was admitted to the Birmingham Small-pox Hospital during the epidemic of 1893-94. She had no vaccination marks on her arms, and she was definitely stated by her parents to be unvaccinated. Yet she had a typically mild abortive attack such as so frequently occurs in vaccinated subjects. She was the only example of such a case in an unvaccinated subject that I had ever seen at that time (we were dealing with a severe strain of the disease), and I regarded her as unique. Whilst she was under treatment, however, a faint but definitely foveated scar, about the size of a threepenny bit, was noticed on her lower lip, and on our inquiring as to its origin we were told that it was left by a sore place which she had had on her lip when a girl, through nursing a baby brother or sister at the time the latter had a bad arm after vaccination. We had no doubt then that the patient had accidentally inoculated herself with vaccinia without her parents realizing its significance. I have a photograph of this case which shows the scar on the lip fairly distinctly.

When a full report on the recent outbreak is available it will be interesting to learn the exact clinical description of the originating case. It is not only scantiness of eruption that is important, but also whether the eruption aborted. In the meantime I can only repeat that such occurrences are sufficiently rare as not materially to affect my argument.—I am, etc.,

Leicester, July 28th. C. Killick Millard.

SCHOOL MEDICAL OFFICER APPOINTMENTS.

Sir,—It is a fundamental part of the policy of the British Medical Association that for equal work equal pay should be given, regardless of sex. To this no member of the Association can reasonably object. A large number of recently qualified lady members of the profession are finding it increasingly difficult to get remunerative work, and many of them are looking in the direction of the school medical service for an appointment. Many vacancies in this branch of work regularly appear in the Important Notices in the Journal. A certain type of man (not very plentiful, I hope) will apply for these underpaid appointments, but education committees and authorities in increasing numbers are selecting women for these posts. The Oldham Education Committee received only six applications for a vacancy. Five of these were from recently qualified ladies, and only one man. This committee wisely consented to re-advertise at the British Medical Association figure of £600. Two education authorities in Scotland (Morayshire and Argyllshire) have recently selected ladies at a salary of £450. Can nothing be done to prevent these young and comparatively inexperienced graduates filling posts where they cannot be respected by their professional colleagues, with whom they are brought into contact in discharging their duties? It is disheartening to young members who desire this work, who desire to be loyal to the Association, and who are realizing what is happening, particularly in the school medical service.—I am, etc.,

July 29th. X. Y. Z.

*** We have shown this letter to the Medical Secretary, Dr. Alfred Cox, who makes the following comment:

"The British Medical Association has used every effort to dissuade both medical men and women from applying for posts at salaries below the recognized standard. A letter is written to every applicant whose name can be ascertained, and much success has thereby been achieved. The Medical Women's Federation has used all its influence in the same direction, and not long ago a letter was written to every teacher of public health subjects in the medical schools asking for their help in dissuading newly qualified students from taking these appointments and thereby lowering the standard of remuneration for the public health services. If "X. Y. Z." will read the report of the discussion on the scale, which appears in the Supplement of August 2nd, he will see that negotiations are proceeding with the bodies representing the employing authorities, and it is hoped that an agreement may shortly be arrived at."

THE ADMINISTRATION OF OXYGEN.

Sir,—In connexion with Dr. T. Stacey Wilson's letter (July 12th, p. 82) in regard to the administration of oxygen, may an old pupil of his be permitted to indicate a method that was suggested to me by a colleague, which both he and I have found to be most successful? It is to give pure oxygen from a nitrous oxide apparatus. Two bagfuls of pure oxygen may be inhaled every hour; the bag is filled and its contents inhaled until the bag is collapsed.

The results in post-influenzal disorders of the heart and in a case of diffuse suppurating peritonitis were astounding.—I am, etc.,

Probus, Cornwall, July 14th. J. C. Jones, M.B.

JOHN HUNTER AND SYPHILIS.

Sir,—While gratefully acknowledging the review of my *Memoir of William and John Hunter* in the British Medical Journal of July 19th, may I write a few lines on the subject of John Hunter's self-inoculation with venereal disease? My own conception of the account contained in Palmer is that he did not intend to communicate syphilis, and that the mixed infection of the case he happened to select was outside his knowledgee and design. To this extent, then, it was inadvertent (see pages 149, 154 of my *Memoir*). I may be wrong, but such is my inference from John Hunter's own words, the exact meaning of which, owing to the then confusion of terms and ideas, is somewhat involved.—I am, etc.,

London, W.9, July 21st. George C. Peachey.

Universities and Colleges.

UNIVERSITY OF CAMBRIDGE.

At a congregation held on July 17th the following medical degrees were conferred:

M.D.—C. B. Cohen.
M.B., B.Ch.—C. E. G. Smith, C. A. Lupton, T. R. Thomson, C. E. Newman, H. D. N. Miller.
M.B.—G. K. Cooper, T. M. Thomas.
B.Ch.—J. R. B. Dearden, A. H. Johns, H. W. H. Holmes, R. A. M. Scott, R. W. Smith.

UNIVERSITY OF LONDON.

University College.

Mr. Richard J. Lythgoe has been appointed Sharpey Research Scholar in physiology. Mr. Lythgoe was Mercers' Company's Scholar at Cambridge. He was placed in the First Class of Parts I and II of the Natural Science Tripos; he has been clinical assistant to Sir John Parsons at the Royal London Ophthalmic Hospital, and demonstrator to Professor Langley in physiology, to Professor Hopkins in biochemistry, and to Professor MacAlister in anatomy. He served in the Royal Garrison Artillery during the war.

The Percy F. MacGregor Scholarship in embryology has been awarded to Mr. G. Payling Wright. He was placed in the First Class in the Honours School of Physiology at Oxford. He held the Theodore Williams Scholarship in pathology at Oxford and the Filliter Exhibition in pathology at University College Hospital Medical School.

UNIVERSITY OF WALES.

At the congregation of the University of Wales held at Bangor on July 17th the following degrees were conferred:

M.B., B.Ch.—D. I. Bowen, D. T. Davies, Edith M. Davies, L. C. Edwards, Martha Griffith, E. D. Owen, Constance Walters.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.

The ordinary quarterly comitia of the Royal College of Physicians of London was held on July 31st, when the President, Sir Humphry Rolleston, was in the chair.

Members.

The following gentlemen, having passed the required examinations, were admitted as Members:

Richard Sydney Allison, M.D.Belfast, Walter Russell Brain, M.B.Oxon., Walter Francis Raphael Castle, D.S.C., M.D.Camb., Alexander Cawadias, O.B.E., M.D.Paris, Philip Cyril Powter Cloake, M.D. Lond., L.R.C.P., Keith Douglas Fairley, M.D.Melb., Charles Basil Sabine Fuller, M.C., M.B.Camb., L.R.C.P., Eric Frank Gartrell, M.B.Adelaide, Frank Bedo Hobbs, M.B.Camb., L.R.C.P., Charles John Lewis, M.D.Birm., L.R.C.P., Samuel Lawrence Ludbrook, M.B.NewZealand, Arthur Arnold Osman, D.S.C., L.R.C.P., Martin Owen Raven, M.D.Oxon., L.R.C.P., Carl Ivo Streich, M.B.Adelaide, Eric Leo Susman, M.B.Sydney, Geoffrey William Theobald, M.B.Camb., L.R.C.P., James Graham Willmore, L.R.C.P.

Licences.

Licences to practise physic were granted to the following 208 candidates who had conformed to the by-laws and regulations and passed the required examinations:

*Harriet E. Acheson, B. E. Ahrens, N. J. Ainsworth, H. McC. Allen, G. Anderton, E. C. Archer, F. H. Armanious, R. N. Aston, A. E. Austen, J. M. Barnard, E. V. Barnes, A. Barnsley, J. C. Barrett, Idris M. Benjamin, T. P. Beswetherick, F. A. Bevan, H. M. Bird, R. Bolton, W. R. Bowen, A. D. Briscoe, *Eileen M. Bronson, A. C. Brown, D. M. Brown, *Doris D. Brown, R. K. Bryce, H. F. Burtt, G. A. H. Buttle, *Doris M. E. Carrington, M. N. Chatterjee, F. E. Chester-Williams, *Edith I. Clark, C. K. Colwill, A. Cooke, H. A. Cooper, J. D. Craig, S. H. Currie, D. D. R. Dale, *Agnes S. Daniel, *Edith M. Davies, J. Davies, *Muriel Davies, V. H. J. Davies, S. C. M. Davison, R. Y. Dawbarn, *Ursula H. de Foubert, M. de Lacey, J. A. F. Denyssen, D. M. de Silva, A. C. Dick, J. C. G. Dickinson, C. P. Donnison, R. H. Dyer, C. J. East, H. E. K. Eccles, A. B. Eddowes, J. E. Elam, *Dorothy K. Elliott, M. N. Emery, *Phyllis V. L. Epps, H. G. Estcourt, T. I. Evans, T. P. Evans, A. Farid, D. W. G. Faris, C. W. S. Fernando, W. W. J. Fernando, H. R. Fisher, F. G. France, H. J. Fuller, *Florence M. Gamble, A. G. D. Gavin, W. T. MacN. Gentle, W. H. Gervis, G. Gillett, A. Glen, I. Gluckman, P. L. Goitein, F. M. Graham, P. L. Gray, W. H. Gray, S. J. H. Griffiths, G. E. Harries, J. Hartsilver, H. Hinchco, R. C. Howard, *Dorothy M. Howse, J. N. Hudson, G. C. Hughes, R. G. W. Husbands, A. G. Hyde, M. H. Jacobs, *Bessie G. Jemson, C. M. Jennings, A. J. R. F. Johnson, D. J. Jones, E. L. H. Jones, R. W. Jones, R. C. Jones, A. Jowell, D. E. Keefe, M. C. H. Kinsdon, I. Kinsler, A. H. Kynaston, J. H. R. Laptain, W. C. Latham, J. J. Laws, S. A. Leader, H. Levit, F. J. Levy, *Nancy R. Lewis, E. M. Liddle, W. R. A. Line, *Rosalie E. Lucas, H. J. McCarthy, J. McCunn, A. F. McGlashan, G. A. McKaig, A. V. Mackenzie, R. S. MacLatchy, J. R. Maleri, H. B. Mann, R. G. B. Marsh, D. J. Martin, F. Martin, G. A. Martin, R. Massingham, J. H. Matthews, L. M. Maybury, B. A. J. Mayo, T. F. Meyrick, K. V. Milburn, W. J. Montague, J. H. Moore, J. G. Morgan, L. Morris, C. J. Murphy, J. W. Nankivell, M. C. O'Connor, J. O. Oliver, F. C. O'Mara, *Helen E. D. E. Ornstein, K. C. L. Paddle, L. J. Panting, H. R. Paterson, *Dorothy E. Peake, A. A. F. Peel, M. S. Pembrey, D. B. Phillips, L. M. J. R. Pilot, G. H. Pitt, L. Platzky, H. G. Poles, A. Pool, *Gwendolen M. Pratt, J. O. Priestley, V. J. Rao, W. E. Rees, H. D. C. Rice, *Jessie L. Robb, W. A. Robb, *Lilian E. Robinson, W. E. Rodgers, G. R. Rolston, F. W. Roques, E. Scott, J. A. Scott, S. J. Scurlock, E. K. Seah, J. Sellick, A. Shirley, A. D. H. Simpson, A. W. H. Smith, *Jean L. Smith, K. S. M. Smith, J. F. Southward, H. L. Sparrow, C. E. Stainthorpe, E. V. Suckling, F. S. Tait, C. Thomas, D. M. E. Thomas, O. F. Thomas, O. O. S. Thomas, W. D. R. Thompson, D. S. Todd-White, G. M. Tothill, J. R. Tree, L. A. S. Trott, C. A. Van Rooyen, G. C. Vaughan, I. R. Vermooten, F. O. Walker, J. L. le C. Walker, H. A. Ware, H. C. Warner, R. L. Washington, H. O. Watkins-Pitchford, A. Watson, B. M. R. West, Vivian E. Whitman, *Mary A. Wiles, W. Wilkinson, R. G. Williams, V. G. Williams, T. J. Wilson, W. M. Winder, A. J. Wrigley, E. Zimmerli.

* Under the Medical Act, 1876.

Diplomas.

The diplomas indicated were granted jointly with the Royal College of Surgeons to the following successful candidates:

Public Health.—H. L. Barker, J. R. Batten, W. G. Booth, L. P. Costobadie, A. Crawford, B. B. Dalal, Edith M. P. Davies, S. R. E. Davies, Helen M. Du Buisson, Mary Esslemont, Gwladys Evans, Dorothy J. L. Gallie, P. C. C. Garnham, G. McN. Hargreaves, Marjorie C. Hawkins, N. R. Jenkins, Elspeth H. R. Livingstone, V. A. Luna, Kathleen F. Matthews, Alice D. Pocock, A. T. W. Powell, I. N. O. Price, Violet Reade, Grace Stevenson, Emma M. Store, E. Tagoe, Blanchette Thomas, P. Thwaites, E. H. Wilkins, Gwendolen Wilson, J. G. Wilson.

Tropical Medicine and Hygiene.—E. Benjamin, R. G. Cochrane, T. Creaser, P. K. Dixon, W. Dunlop, R. J. Gittins, A. W. Grace, M. L. C. Irvine, R. B. MacGregor, H. G. D. Mathur, Dorothy Mitchell, S. Nag, G. C. Ramsay, Beatrice A. S. Russell, Ruth M. Scutt, H. W. Torrance, B. B. Yodh.

Psychological Medicine.—J. S. Harris, W. J. T. Kimber, N. Mac eol, E. G. T. Poynder, D. Slight.

Ophthalmic Medicine and Surgery.—G. ApThomas, H. M. Armstrong, B. Basu, W. J. Chapman, J. M. Damany, G. Kumar, S. H. Miles, E. V. Oulton, Freda Ramsay, J. Rego, R. S. Shah, S. S. Sumner, K. N. Tandon, H. E. Variava.

Laryngology and Otology.—W. R. Beavis, J. B. Cavenagh, J. Hare, H. I. Marriner, T. G. Wynne.

The Murchison Scholarship was awarded to Mr. Norman William Snell, M.R.C.S., L.R.C.P.

College officers, members of committees, and examiners were appointed on the nomination of the President, the Council, and the Library Committee:

Censors: Dr. H. G. Turney, Dr. Farquhar Buzzard, Dr. James Calvert, Dr. Cyril Ogle.

Emeritus Treasurer: Sir Dyce Duckworth, Bt., M.D. Treasurer: Dr. Sidney Phillips.

Examiners.

Chemistry.—C. S. Gibson, B.Sc., R. H. A. Plimmer, D.Sc.
Physics.—W. E. Curtis, D.Sc., Sidney Russ, D.Sc.
Practical Pharmacy.—A. E. Russell, M.D., E. A. Cockayne, M.D., Philip Hamill, M.D., Nathan Mutch, M.D., W. E. Dixon, M.D.
Physiology.—J. B. Leathes, M.B., John Mellanby, M.D.
Anatomy.—T. B. Johnston, M.B.
Medical Anatomy and Principles and Practice of Medicine.—H. Morley Fletcher, M.D., A. P. Beddard, M.D., W. C. Bosanquet, M.D., J. W. Russell, M.D., C. R. Box, M.D., Sir James Purves-Stewart, K.C.M.G., M.D., Charles Bolton, M.D., L. A. Smith, M.D., Sir Charlton Briscoe, Bt., M.D., J. A. Torrens, M.D.
Midwifery and Diseases peculiar to Women.—J. P. Hedley, M.B., Sir Ewen Maclean, M.D., T. G. Stevens, M.D., J. D. Barris, M.B., H. J. F. Simson, M.B.
Public Health.—Part I: H. Wilson Hake, Ph.D. Part II: D. S. Davies, M.D.
Tropical Medicine.—Sir Percy Bassett-Smith, K.C.B. (Bacteriology), Sir Leonard Rogers, M.D. (Diseases and Hygiene of the Tropics).
Ophthalmic Medicine and Surgery.—J. Stansfield Collier, M.D.
Laryngology and Otology.—Sir StClair Thomson.
Psychological Medicine.—Part I: E. D. Macnamara, M.D. Part II: R. Percy Smith, M.D., C. M. Hinds Howell, M.D.

A communication was received from Mr. C. F. Rey on behalf of H.H. Tafari Makounen, the Regent of Ethiopia, expressing his appreciation of his visit to the College and sending a commemorative medal in memory of it.

The President brought before the College the results of communications with (1) the Home Office, concerning veronal; (2) the Ministry of Health, concerning heroin: A report by Sir William Hale-White and Sir William Willcox on the question of the prohibition or the limitation of the manufacture of heroin.

The Moxon Medal was awarded to Sir Leonard Rogers, M.D., F.R.S., on the recommendation of the Council.

The adjudicators recommended that the Weber-Parkes Prize and Medal be awarded to Professor Calmette.

Dr. Sidney Martin and Sir Arthur Newsholme were re-elected Representatives on the Executive Committee of the Cancer Research Fund.

The President announced that he had appointed Sir Frederick Mott, M.D., F.R.S., to deliver the Harveian Oration in 1925.

A report was received from the representative of the College on the General Medical Council.

After some formal College business had been transacted the President dissolved the comitia.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

An ordinary council meeting was held on July 31st, when the President, Sir John Bland-Sutton, was in the chair.

Diplomas of Membership were granted to 208 candidates.* Diplomas in Tropical Medicine and Hygiene were granted jointly with the Royal College of Physicians to seventeen candidates, and in Ophthalmic Medicine and Surgery to fourteen candidates.*

Sir W. Watson Cheyne will deliver the Lister Memorial Lecture on Thursday, May 14th, 1925.

Sir Charles Ballance was re-elected a member of the Executive Committee of the Imperial Cancer Research Fund.

ROYAL COLLEGE OF SURGEONS IN IRELAND.

The following candidates have been approved at the examinations indicated:

Primary Fellowship.—T. G. Wilson.
Final Fellowship.—J. D. Cherry, Majorie F. Sibthorpe, J. Tehan.

CONJOINT BOARD IN SCOTLAND.

The following have passed the final examination and have been admitted L.R.C.P.Ed., L.R.C.S.Ed., and L.R.F.P.S.Glasg.:

Amy B. R. A. Perriton, A. H. Forman, M. A. Watson, E. N. Jamieson, M. M. Tannahill, C. C. Robson, V. C. G. Menon, P. Murray, H. V. Ritchie-McKinley, C. F. Deutrom, W. A. Ekanayake, S. B. Jones.

* The names are printed in the report of the comitia of the Royal College of Physicians published in the preceding column.

H. Amarasinghe, Mary C. Semple, J. Donnelly, O. H. D. Oliver, S. Thambipillai, A. Menzies, R. S. Caldwell, M. Goldberg, E. S. Greaves, J. H. MacAlpine, S. N. Bandyapadhay, J. M. Anderson, S. Levenson, A. E. Coyne, J. G. O'Keeffe, D. M. Safwat, J. F. Sweeney, G. M. Rose, D. T. Gemmell, C. Campbell, V. Bell, D. M. Gray, D. R. Paterson, and H. Schulgasser.

The following candidates have been approved at the examination indicated:

FINAL EXAMINATION.—*Medicine*: B. S. Jayawardena, F. El-Ahmadi, N. T. Yusif, H. A. Newton, H. H. James, N. Wren, G. H. Tarras, P. A. M. Jayewardene, J. E. Israel, T. J. Muir, and N. Ampalavanar. *Surgery*: B. S. Jayawardena, Molly F. Churcher, H. H. James, J. Kirkness, G. H. Tarras, A. Vasudev, E. S. Brohier, D. Stewart, J. P. Subramamiam, and N. Ampalavanar. *Midwifery*: B. A. M. McKinney, P. Groarke, T. G. S. Harkness, F. El-Ahmadi, J. T. Smith, D. S. Middleton, Molly F. Churcher, N. Wren, R. F. Pagnam, J. M. Rutherford, J. E. Israel, V. B. van Dort, E. S. Brohier, and D. Stewart. *Medical Jurisprudence*: Winifred G. Price, D. B. Cruickshank, C. A. Basil, T. W. Chapman, F. Blacklee, A. G. Cruikshank, J. F. Wallace, H. B. Martin, G. McCracken, W. J. Ledgerwood, J. B. Hutchison, W. W. Crawford, J. Lees, P. Henry, I. Michaelson, Eliza Bell, J. T. M. Symington, H. S. Kent, J. C. Shiach, Jessie R. Bruce, A. F. Chisholm, E. G. Douglas, T. M. Ormiston, J. M. Coutts, G. B. Burnett, Catherine Millar, A. A. F. Shepherd, D. B. Craig, J. W. Wylie, T. D. Gould, R. J. Snodgrass, A. J. M. Gall, C. Ismail, and J. A. Hyde.

CONJOINT BOARD IN IRELAND.

THE following candidates have been approved at the examinations indicated:

FINAL PROFESSIONAL EXAMINATION.—P. M. Banim, T. G. Boyle, Dorothy E. Campbell, E. J. Daly, W. O. Dunwoody, T. T. W. Eaton, V. D. Gordon, Attracta Halpenny, A. Heron, J. J. Hogan, J. A. Kennedy, G. A. Moorhead, W. McCurry, A. S. ff. O'Carroll, E. Orr, F. R. O'Shiel, Muriel V. Prentice, J. Shiel, R. A. McE. B. Simpson, A. W. P. Smyth, M. J. Walsh.
D.P.H.—W. E. R. Dimond, W. H. Smith.

SOCIETY OF APOTHECARIES OF LONDON.

THE following candidates have passed in:

SURGERY.—W. B. Arnold, K. R. Chaudhri, C. E. Donaldson, R. Hare.
MEDICINE.—H. P. Burns, J. C. C. Langford, H. Morris (Section I).
FORENSIC MEDICINE.—J. O. W. Bland, J. C. C. Langford.
MIDWIFERY.—H. L. Bernstein, J. L. Hopkins, G. L. W. Iredale, J. de V. Maingard.

The Diploma of the Society has been granted to Messrs. W. B. Arnold, H. P. Burns, K. R. Chaudhri, C. E. Donaldson, R. Hare.

The Services.

Major-General S. Guise Moores, C.B., C.M.G., R.A.M.C.(ret.), has been appointed house-governor and medical superintendent of the Osborne Convalescent Home for officers of the Navy, Army, Air Force, and Indian Army, on the retirement of Surgeon Lieut.-Colonel Sir W. R. Crooke-Lawless, K.C.V.O., C.B., C.I.E., M.D.

DEATHS IN THE SERVICES.

Lieut.-Colonel Morgan David O'Connell, R.A.M.C.(ret.), died in Dublin on June 3rd. He was born at Kilmallock on May 13th, 1855, and educated in the medical school of the Royal Irish College of Surgeons, taking the L.R.C.S.I. in 1875, and the L.K.Q.C.P. in 1876. He entered the army as surgeon on August 4th, 1878, became lieutenant-colonel after twenty years' service, and retired on August 15th, 1903. He served in the Sudan campaign of 1885, at Suakin, receiving the Egyptian medal and the Khedive's bronze star; and in the South African war in 1899-1902, when he was in charge of a general hospital, with the rank of colonel; he took part in operations in Cape Colony and in the Orange River Colony, and received the Queen's and King's medals, with two clasps to each. He was re-employed during the recent great war, from January 1st, 1915. He was the author of a work entitled *Climate and Ague*, published in 1909.

Major Patrick Ambrose McCarthy, I.M.D., died in the General Hospital, Calcutta, on May 15th, aged 56. He entered the department in 1885, received a commission as lieutenant on December 26th, 1910, and attained the rank of major on December 25th, 1917. He was civil surgeon of Mogok, the ruby mines district in Burma, and at the time of his death was the senior officer but one of his department.

Dr. William Henry Simmons, late R.A.M.C., died suddenly in West Africa on June 11th, aged 29. He was the youngest son of the late Charles James Simmons and of Mrs. Simmons of Hove, and was educated at Guy's, taking the M.R.C.S. and L.R.C.P.Lond. in 1918. He entered the R.A.M.C. as a lieutenant in the Special Reserve on November 14th, 1918, just after the armistice, and became captain after a year's service. Before joining he had held the post of out-patient officer at Guy's, and subsequently those of house-surgeon of St. John's Hospital, Lewisham, and of assistant resident medical officer at the National Hospital for Consumption, Ventnor; afterwards he joined the West African Medical Staff.

Captain Hugh Michael Collins, I.M.S.(ret.), died on May 8th. He was born on October 23rd, 1890, and educated at Madras University and at the London Hospital, taking the M.R.C.S. and L.R.C.P.Lond. in 1915. Immediately afterwards he took a temporary commission as lieutenant in the R.A.M.C., and was appointed to the I.M.S. as lieutenant and temporary captain on May 30th, 1916. He was invalided two years ago. During the recent war he served in Mesopotamia, in the operations in South Kurdistan in 1919, was mentioned in dispatches in the *London Gazette* of June 15th, 1919, and February 12th, and received the O.B.E. on November 15th, 1919.

Obituary.

T. D. LISTER, C.B.E., M.D.

WE regret to record the death of Dr. Thomas David Lister, C.B.E., who died, on July 30th, at his residence at Henley, aged 55. He was educated at Aske's School and Guy's Hospital, where he graduated as M.B., B.S.Lond., and obtained the diplomas M.R.C.S., L.R.C.P. in 1892. Two years later he proceeded to the degree of M.D., and in the same year became F.R.C.S. In 1900 he received the diploma of M.R.C.P. He was house-surgeon at Guy's Hospital from 1893 to 1894, and pathologist to the East London Hospital for Children from 1897 to 1900.

Dr. Lister was consulting physician for chest cases to the Prince of Wales's Hospital for Officers, Marylebone, from 1917 to 1919. In the latter year he was elected a member of the Senate of London University, and in 1920 he received the C.B.E. Whilst honorary advisory physician of the council of the National Association for the Establishment and Maintenance of Sanatoria for Workers Suffering from Tuberculosis he drafted the scheme for Benenden Sanatorium. He was the head office medical adviser of the Royal Exchange Assurance Corporation, the Friends' Provident Institution, and the North British and Mercantile Insurance Company, physician to the National Union of Teachers, consulting physician to the Post Office Sanatorium Society, and the Association of Local Government Officers, an invited member of the Panel Committee for the County of London, and of the Hospital Sunday Fund Board of Delegates. His other appointments included those of physician to the Mount Vernon Hospital and the Royal Waterloo Hospital for Children and Women. His publications included *Industrial Tuberculosis* (1910), *Sanatoria for the People* (1911), and various contributions on life assurance, children's diseases, consumption, and allied subjects. He leaves a widow, two sons, and a daughter.

Dr. W. F. MARSH JACKSON of Smethwick died on July 21st in his 83rd year. He was the son of the Rev. William Jackson, at one time vicar of St. John's, Workington, was educated at Queen's College, Birmingham, and took the diplomas of M.R.C.S.Eng. in 1868 and L.R.C.P.Edin. and L.M. in 1888. He went to Smethwick in 1864, first as assistant and then in partnership with Dr. Hicks. From 1874 to 1922 he served as certifying factory surgeon, and on his retirement from that appointment received many letters, including one from the Home Office, congratulating him upon his long and faithful service. The Volunteer movement made a strong appeal to Dr. Jackson's patriotic spirit; he was appointed honorary surgeon in 1868, and in 1892 received the Volunteer Officers' Decoration for long service. He was appointed a justice of the peace on the formation of the borough bench for Smethwick in 1901. He was also consulting medical officer of health and divisional surgeon to the county police. Prior to the proceedings at the borough police court on July 24th, the chairman spoke of the high esteem and respect in which Dr. Marsh Jackson was held by everybody in the district.

Dr. GEORGE FISHER, who died suddenly of angina pectoris, aged 78, on August 1st, was the son of George Fisher, who practised at Bawtry, Yorkshire. He received his medical education at Leeds and took the diplomas of M.R.C.S.Eng. in 1876, and the L.R.C.P.Edin. and L.M. in 1874. He served for two years as house-surgeon at the Worksop General Dispensary. After practising for two years in New Zealand, where he was surgeon to the Thames Gold Field Hospital, he returned to this country and was in practice at Shere, Surrey, until 1907, when he retired. In that year he went to live at Dorking, where he identified himself with the public life of the town, serving on the Urban Council for many years, and remaining a member until the time of his death. Dr. Fisher is survived by one son and two daughters.

The well known American psychologist, Professor STANLEY HALL, has recently died at the age of 78.

Medical News.

On August 1st, 1924, the London School of Tropical Medicine became incorporated in the London School of Hygiene and Tropical Medicine. The Director of the new school, Dr. Andrew Balfour, informs us that invitations were sent to all members of the staff of the former institution, and, so far as can be told at the moment, all these members have signified their desire to become members of the staff of the new London School of Hygiene and Tropical Medicine.

The St. Bartholomew's Old Students' dinner will be held on Wednesday, October 1st, in the Great Hall of the hospital at 7 for 7.30 p.m., with Dr. J. H. Drysdale in the chair. The cost of the dinner is 25s. 6d. (inclusive of wine); early application should be made to Sir C. Gordon-Watson, K.B.E., 82, Harley Street, W.1.

Following upon the resignation of Mr. J. B. Banister from the post of gynaecologist to the Prince of Wales's Hospital, Tottenham, on his appointment to Charing Cross Hospital, the governors have invited Mr. Arthur Giles, consulting gynaecologist to the hospital, to resume active work on the staff as senior gynaecologist, and have appointed Mr. Aubrey Goodwin as gynaecologist.

The triennial meeting of the International Institute of Anthropology will be held in Prague from September 14th to 21st. It will deal with the historical and morphological aspects of anthropology, comparative ethnology, social psychology, and eugenics. Short excursions will be arranged in Bohemia and longer ones in Moravia and Slovakia.

The French Congress of Oto-rhino-laryngology will be held at the Paris Faculty of Medicine, under the presidency of Professor Jacques of Nancy, from October 15th to 18th, when the following subjects will be discussed: (1) Posterior sinusitis and its ocular complications, introduced by Canuyt, Ramadier, and Velter; (2) Diathermy in oto-rhino-laryngology, introduced by Bourgeois, Dutheillet de Lamothe, Portmann, and Payet. Further information can be obtained from the general secretary, Dr. G. Liébault, 216, Boulevard Saint-Germain, Paris.

The twenty-fourth French Congress of Urology will be held in Paris, under the presidency of Dr. Genouville, on October 8th, when a discussion will be opened by Drs. Rochet and Thévenot of Lyons on the bladder after nephrectomy for tuberculosis. Further information can be obtained from the general secretary, Dr. O. Pasteau, 13, avenue de Villars, Paris, VII^e^.

A post-graduate course will be held in Vienna from September 29th to October 11th, dealing with modern developments in medical and surgical treatment, and from November 24th to December 6th there will be an intensive course in children's diseases. Detailed information can be obtained from Dr. A. Fischel, Dean of the University.

The West India Red Cross Society exists to help in reducing the heavy infant mortality in the British West Indies and generally in promoting the welfare of that portion of the empire. It is affiliated to the British Red Cross Society and several institutions in various islands. It held a meeting in London on July 25th, which was addressed by Dr. Andrew Balfour, Director of the London School of Hygiene and Tropical Medicine.

Sir Martin Conway has written, and the Paris, Lyons, and Mediterranean Railway has published in English, a very well illustrated pamphlet entitled *A Week-End in the Jura*. He begins by stating that it is possible to leave Victoria Station, London, at 11 o'clock on a Friday morning, to be back there again at 7 o'clock on the following Tuesday evening, and to have enjoyed three full days of motoring through the Jura mountains. Copies of the pamphlet can be obtained (post free) from the offices of the company, 179, Piccadilly, London, W.1.

The sixth Congrès français de Natalité will be held at Strasbourg from September 25th to 28th. It will consist of seven sections, devoted to legislation, economics, statistics, morality and education, social hygiene, dwelling houses, and agriculture respectively.

Post-graduate courses on dermatology and syphiligraphy will be held at the Hôpital St. Louis, Paris, under the direction of Professor Jeanselme, commencing on October 3rd and November 3rd respectively. The fee for each course is 150 francs. A detailed programme will be sent on application to Dr. Burnier, Hôpital St. Louis, Paris.

The issue of *Paris Médical* for July 19th, which is devoted to orthopaedic surgery, contains an article by Dr. Roshem of Cannes on Lord Byron's club-foot illustrated by Platier's caricature.

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* British Medical Journal *alone unless the contrary be stated.* Authors desiring reprints of their articles published in the British Medical Journal are requested to communicate with the Financial Secretary and Business Manager, 429, Strand, W.C.2, on receipt of proof.

Correspondents who wish notice to be taken of their communications should authenticate them with their names—not necessarily for publication.

Communications intended for the current issue should be posted so as to arrive by the first post on Monday or at latest be received not later than Tuesday morning.

All communications with reference to advertisements as well as orders for copies of the Journal should be addressed to the Financial Secretary and Business Manager, 429, Strand, London, W.C. Attention to this request will avoid delay. Communications with reference to editorial business should be addressed to the Editor, British Medical Journal, 429, Strand, W.C.2.

The telephone number of the British Medical Association and British Medical Journal is Gerrard 2630 (Internal Exchange). The telegraphic addresses are:

EDITOR of the British Medical Journal, *Aitiology Westrand, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westrand, London.*

MEDICAL SECRETARY, *Mediocra Westrand, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone 4737, Dublin), and of the Scottish Office, 6 Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

QUERIES AND ANSWERS.

Millstone Flour and National Nutrition.

Mr. E. Muirhead Little, F.R.C.S., replying to Dr. J. Macpherson Lawrie's question in the Journal of August 2nd (p. 218), says he gets excellent bread made of stone-milled flour from Messrs. Crang and Son, 3, Thayer Street, Marylebone, W.1.

Income Tax.

Request for Certified Accounts.

"S. W. F." has made a return of income on the average of the three years 1921, 1922, and 1923, but has now been asked by the local inspector of taxes to supply certified copies of the accounts of the practice for 1922 and 1923.

*** The accounts requested are, we presume, statements of gross cash receipts and classified expenses for each year. Such accounts would probably be only an elaboration of the calculations which "S. W. F." no doubt prepared for himself when he calculated his average profits, and we suggest that he might make out such statements and certify them to be correct to the best of his knowledge and belief, and forward them as being a reasonable compliance with the inspector's request.

Motor Car Transactions.

"J. W. J." bought a motor car in October, 1923, value £200, when a motor cycle was taken in part exchange (£90). The value of the motor cycle at that date was £150.

*** Assuming that £150 was the cost of the cycle in the first place, the position is that "J. W. J." has improved his professional equipment and at the same time has in effect covered his renewal cost—in other words, the net outlay of £200 – £90 = £110 represents (*a*) replacement of cycle to the extent of £60, *plus* (*b*) £50 expended on improvements. On these grounds the £60 is clearly allowable.

"Motorist" bought about six years ago a second-hand B. car for £130, and in 1923 replaced it by a new M.C. car at a cost of £255 less £30 received for the old car.

*** The net expenditure of £225 is in part an improvement of the equipment, seeing that the original car was a second-hand one, and the whole of the expenditure is not allowable for income tax purposes. £100 (that is, £130 – £30) is allowable, and £125 represents the capital outlay.

"A. B." sold an A. J. car for £35 and purchased an O. car for £365 in replacement. An A. J. car would then have cost £475. What is the correct deduction to be made?

*** It must be remembered that as no depreciation allowance can be claimed by a professional practitioner, the deduction must be restricted to out-of-pocket expenses; the cost of replacement was, in fact, £365–£85=£280, and "A. B." cannot claim to deduct a greater sum, even though that sum would have been allowable if he had expended it. He will be well advised, however, to bear in mind that his standard of replacement is a £475 car and not a £365 car, so that if, for instance, he were to replace his new car by one costing £475 no portion of the then cost would represent capital improvement.

LETTERS, NOTES, ETC.

LASSOING A PAPILLA.

DR. J. G. BENNETT (Hyde) writes: I had a rather curious case a few days ago of a weaver who, in the act of sucking up thread from the shuttle, found that the thread had become attached in her throat and could not be removed. When I saw the patient she had the thread hanging out of her mouth and the other end was firmly fastened in what I surmised must be her larynx. However, on examining the throat, I found that the distal end of the thread was anchored on to a circumvallate papilla at the root of the tongue. Pulling quite forcibly would not dislodge the thread, so I perforce had to seize the papilla in artery forceps and avulse it with the cotton attached. The interest of the case lies in the apparently impossible happening, for the thread end, when sucked into the mouth, must have become knotted round what at the best is a very tiny projection. I should think the chances of this occurring again would be about one in a million.

ACHOLURIC JAUNDICE.

DR. ROBERT PLATT (Sheffield) writes: May I correct a small error which appeared in last week's issue? In the discussion following the papers on jaundice, at the Annual Meeting (August 2nd, p. 183), I am reported as having said "that in acholuric jaundice the red cells might really be unduly resistant to abnormal osmotic pressure." This is not so. We know (by the ordinary "fragility" test) that they are *less* resistant to hypotonic solutions. My point was that cells which are less resistant to hypotonic solutions are usually *more* resistant to haemolytic agents acting on the cell membrane, such as saponin. (See Bayliss, *Principles of General Physiology*, third edition, p. 133.) And, as it is unlikely that the haemolysin at work in acholuric jaundice should act by altering the osmotic conditions, I suggested that what we usually called fragility might really be increased resistance.

A NEW CONTRACEPTIVE PESSARY.

DR. J. A. DAVIDSON (Hanwell, W.) writes: Some time ago I was asked to suggest a contraceptive having the following qualities: ease of application, certainty of action, and freedom from harmful results, especially with regard to the safeguarding of the natural protective agent in the healthy vagina—the *Bacillus lacticus*. Lactic acid of 1 per cent. solution proved on experiment to be fatal to spermatozoa and not injurious to the lactic bacillus. The pessary, however, contains 2 per cent., on account of the neutralizing effect of the alkaline seminal and uterine secretions. It is spherical, 1¼ in. in diameter, and dissolves slowly in contact with moisture. When wet it has a smooth, soapy surface, which allows it to be inserted without the aid of a lubricant. In five to ten minutes it begins to disintegrate, and is effective and remains so for seven to nine hours. Its shape avoids the risk of misplacement and its size obstructs the vagina. The dissolved surface forms a creamy substance, which occludes the os uteri and fills all the irregularities of the mucous surface. The spermatozoa are thus prevented from entering the uterus. No douching is required, nor is it desirable. The simplicity of its constitution and manufacture brings it within the reach of the poorer classes, for whose use, and that of the unfit, it is primarily intended.

DIFFICULT MIDWIFERY AT SEA.

DR. J. E. ST. GEORGE QUEELY (Walton-on-Thames) sends an account of a severe case of midwifery which occurred on a mail steamer returning from the East. The patient was brought on board as the boat was starting; she was about nine months pregnant, and during the night had seven eclamptic fits with continued hiccup. The urine was full of albumin and her general condition was bad; the Rotunda Hospital treatment for eclampsia was tried—namely, half a grain of morphine followed by quarter-grain doses, until altogether she had received three grains by hypodermic injection. Both the fits and hiccups ceased, and she was able to retain a little milk and barley water. After two days the urine began to clear, although a little albumin remained. Labour pains commenced on the third day after this treatment; they were weak, with rather long intervals, but on the fourth day they became stronger, and with a little assistance a healthy child was born. After a short time, since there was no sign of the placenta being expelled, in spite of the usual treatment, manual extraction appeared necessary. The placenta was found adherent and high up; a good deal of haemorrhage followed, but the patient progressed favourably afterwards, and was transferred to a nursing home at Liverpool, where she completed her recovery. The only person available to help was one stewardess.

PNEUMONIC PLAGUE.

DR. F. D. BANA (Bombay) writes: Allow me to point out that Colonel Glen Liston in his lectures on the history of the plague omits to mention that it was the late Colonel Childe, I.M.S., then Professor of Clinical Medicine in the Grant Medical College, Bombay, who first discovered the presence of *B. pestis* in the sputum of cases of pneumonic plague (it was, as Colonel Liston says, Dr. Viegas who called it plague when it visited Bombay in 1896). By this omission he does great injustice to the memory of that great clinician and physician of his times in this part of Western India. The late Colonel Childe was much liked and respected by his students. He was a great clinician of his time whose advice was always sought for eagerly in Bombay and its Presidency.

SECOND ATTACK OF MEASLES.

DR. ALEXANDER C. LAMBERT (Chiaotso, Honan, China) writes: In the issues of April 26th and May 3rd Drs. Kemp and Davidson write on the subject of second attacks of measles. Perhaps my own personal experience of three attacks of what were presumably measles may be of interest. I have very distinct recollections of suffering in my schooldays, at the age of 11, from an attack of rubella, which was shortly afterwards followed by definite measles; and I have even now very clear recollections of the difference in the two rashes and the more severe symptoms of the measles. My next attack of measles was at the age of 35, when I was in practice in Nanking, China. The attack was mild but definite. My last attack was at the age of 45, while serving with the R.A.M.C. in Mesopotamia. In this instance prodromal symptoms were present for two or three days before the rash appeared. Measles was prevalent in the Force at the time, and other members of my unit were attacked. There was a definite rash followed by desquamation. I am hoping that immunity has now been established, for grey hairs and measles are apt to provoke the irreverent to unseemly mirth.

THE LEFT-HANDED CHILD.

DR. CHARLES F. HARFORD (London) writes: I am grateful to Dr. Elder for his kind references to my letter in your issue of June 21st. Undoubtedly it was my intention to suggest that the allied habits of squint, left-handedness, and stammering were primarily of psychogenic origin. I am aware, however, that this statement is liable to be misunderstood owing to the way in which terms are used by different writers. I have endeavoured to make quite clear my own meaning in a small book entitled *Mind as a Force*. In the chapter on mind and body on page 76 I say: "There is no need to discuss at length the effect of the body upon the mind, for this is universally recognized." After quoting certain instances I continue: "We desire to make quite clear the converse of this picture—namely, that the mind affects the body in countless ways for good and ill, and if we must speak of priority we believe that the mental impulse precedes the bodily reaction." In the same book I have discussed the relations of physiology and psychology. In the problem of heredity which Dr. Elder puts to me I am inclined to accept his second alternative of "the psyche *qua* psyche in one individual begetting a similar psyche in another." But this is a big question. As to the method of educating children with faulty habits "patient gradual training" seems to be a good description of what is necessary. It is, however, of the utmost importance to realize that where there is an emotional difficulty it may be necessary to deal with this. On a recent occasion I was giving a popular lecture upon dreams, and referred to the problem of left-handedness. A teacher who was present stated that he had been left-handed and every means to help him failed until he became engaged to be married, when the difficulty was soon solved. In the early stages of this correspondence mirror-writing was particularly noticed. I had not been brought into touch with this phenomenon until after the writing of my last letter. Since then, on June 19th, a youth of 17 came before me with right internal strabismus. When questioning him in my usual routine as to left-handedness I found that he was a mirror-writer with his left hand, and in this way he could write as well with his left hand as with his right. Nothing further needs to be said as to this beyond what has been said by your other correspondents. I noted, further, that the attitude of this boy to his mother was sufficient to justify the conclusion that he was suffering from the result of a mother-complex.

ADMINISTRATION OF OXYGEN.

DR. SHAPURJI A. BANKER (Bombay) writes: Dr. Laing (June 14th, p. 1074) has mentioned the early use of oxygen in pneumonia. I have given oxygen in early cases of bronchopneumonia in children, some of very severe type following measles, with marked benefit. Respiration rate is lowered by one-fourth to one-half, cyanosis disappears, restlessness and distress are diminished, sleep follows, and the general well-being of the patient is ensured. In all cases of pneumonia and bronchopneumonia with increased respiration, cyanosis, and distress, oxygen should be administered early to be of benefit. Like other remedies administered late it is bound to fail when marked toxaemia and cardiac failure are setting in.

DIAGNOSIS OF SMALL-POX.

A Correction.

OUR Reporter in the Section of Medicine writes: In the preliminary report of Dr. Killick Millard's paper on the diagnosis of small pox read at the Bradford meeting, which appeared in the JOURNAL of August 2nd (p. 183), there is one very serious mistake, for which I express my regret. In describing the distribution test Dr. Millard said that if the lesions were more numerous on the limbs than on the trunk the case was almost certainly one of small-pox, whereas if the lesions were more numerous on the trunk the case was almost certainly one of chicken-pox. In the report these characteristics of the two diseases were transposed; the correct version will appear in due course in the full report of the Section.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 32, 33, 35, 36, and 37 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 34 and 35.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 96.